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CHAPTER 4

Eugene F. Kranz Toledo Express Airport Development Alternatives

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Development Alternatives

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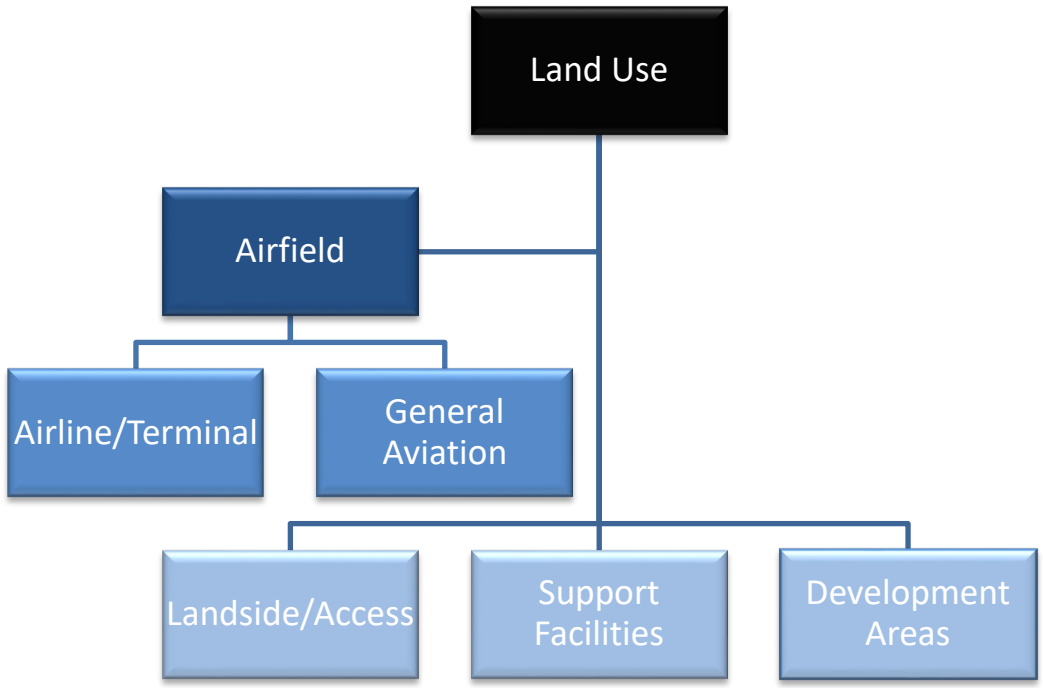
DEVELOPMENT ALTERNATIVES

4.1 INTRODUCTION

This chapter assesses airport improvement options for the Eugene F. Kranz Toledo Express Airport (TOL or Airport), based on the facility requirements detailed in Chapter 3. The objective is to ensure that these facilities can meet projected activity demand, utilize available land efficiently, adhere to FAA airfield design standards, and align with the preferred airport growth strategy. The development alternatives presented here have undergone thorough analysis, refinement, and stakeholder input to create plans that reflect community values, Airport preferences, and the distinctive operational characteristics of the Airport.

Leading and trailing facility categories are defined to establish a hierarchy based on their influence on one another. Leading elements encompass critical airport infrastructure, notably the overall land use, and the airfield (runways and taxiways) at TOL. These, in turn, impact the development of commercial passenger terminal facilities, and general aviation support (GA) facilities. Trailing elements, on the other hand, are influenced and dependent on the leading elements. At TOL, these include airport support facilities, on-airport access, and development/redevelopment areas. **Figure 4-1** shows the relationship between leading and trailing planning elements at TOL.

FIGURE 4-1
AIRPORT PLANNING FACILITY CATEGORIES



Source: RS&H Analysis, 2023

The Toledo-Lucas County Port Authority, the operator of TOL, has established six core pillars for planning and growth moving forward at the Airport, shown in **Figure 4-2**. They are:

- ***Continues Capital Improvement Investment***
- ***Air Service Development***
- ***Reestablish Cargo Operations***
- ***Aviation Education and Maintenance Center***
- ***Support Tenants/Ohio Air National Guard***
- ***Build-Out of Facilities and Business Expansion***

FIGURE 4-2
TLCPA PILLARS OF DEVELOPMENT

Source: Toledo-Lucas County Port Authority, 2023

In order to ensure that these goals and guiding factors are maintained throughout the planning period, Land Use Planning is the first component of the process. Smart, sustainable, efficient land use planning maintains flexible development opportunities for the above goals and objectives. This involves determining which portions of Airport property will be maintained and reserved in the long-term for development of:

- Airfield
- Terminal and airlines
- General aviation
- Aviation support facilities
- Air cargo, maintenance/repair/overhaul (MRO), aeronautical industrial/commercial development
- Non-aeronautical development

Preservation of space for environmental conservation, noise land, and airfield safety is crucial. This will be discussed subsequently in the ***Environmental Overview***.

As land use planning leads the facility planning, it guides planning for the airfield infrastructure itself throughout the development period. As the airfield supports all aeronautical activity at the Airport, this subsequently guides development of Terminal/Airline facilities, and General Aviation facilities. These make up the leading elements of the planning process. The trailing elements, which are planned around the leading elements, are airfield support facilities, landside access, and development of aeronautical and non-aeronautical zones on surplus land.

4.1.1 Alternatives Development Process

Additionally, development alternatives align with the Airport's vision, goals, NPIAS role, and industry trends. Therefore, weighing options against EONS performance principles is a recurring theme in this Master Plan, forming the basis for defining evaluation criteria. The EONS categories are as follows:

- Economic Viability
- Operational Efficiency
- Natural Resource Conservation
- Social Responsibility

The process of identifying and selecting alternatives for the preferred development plan involved a series of interconnected steps. Initially, preliminary alternative concepts were generated for each element to meet the facility requirements outlined in **Chapter 3**. These preliminary options underwent evaluation using specific parameters, including input from stakeholders, which informed the refinement of each element under consideration. The outcome is a set of preferred alternatives that were subsequently addressed in the implementation chapter, where cost and necessity determine the logical project phasing. This process is comprised of the following steps:

- Evaluate and define preferred airport management structure and policies
- Describe and evaluate existing airport land use patterns
- Craft an ultimate on-airport land use pattern vision
- Consider locations of off-airport properties with strategic acquisition significance
- Delineate FAA airspace limitations and existing environmental conditions
- Define facility alternatives evaluation criteria

- Create alternative facility development options in-line with forecast demand, a preferred management/policy structure, and the established airport vision
- Evaluate preferred options against established criteria
- Share analysis information with stakeholders and general public for feedback and insights and refine as appropriate
- Select preferred future development

4.1.2 Alternative Concept Evaluation Criteria

The alternatives process must define evaluation criteria to measure all facility development concepts. During the alternative development process, assessments rely on guidance from the Airport visioning process, aviation industry research, and established planning best practices. Each facility alternative is assessed against the following criteria:

- Operational safety and public safety
- Operational efficiency
- FAA airfield design standards for critical aircraft
- Balance of airfield, terminal, and landside facilities
- Resolution of current issues
- Adequate/appropriate level of service provided (pedestrian and vehicular)
- Long-term facility requirements are met
- Ease of implementation
- Costs (capital and operating)
- Flexibility and future expansion potential
- Public and tenant operational impacts mitigated/minimized
- Environmental impacts and sustainability

4.2 AIRPORT LAND USE

As previously discussed, before addressing immediate facility needs and directing development during the long-term planning period, it is beneficial for an airport to establish a long-term land use vision. This vision serves as a constant reference point for decision-making throughout the airport's lifespan, regardless of current leadership. It ensures consistency in airport growth, enhancing community service, and reducing counterproductive development costs. This process begins with evaluating current land use patterns, reviewing FAA guidelines on dimensional criteria (e.g., Code of Federal Regulations Part 77/Federal Aviation Regulations, FAA AC 150/5300-13B *Airport Design*, etc.), and assessing environmental conditions both on and around the airport. **Figure 4-3** depicts the existing airport land use.

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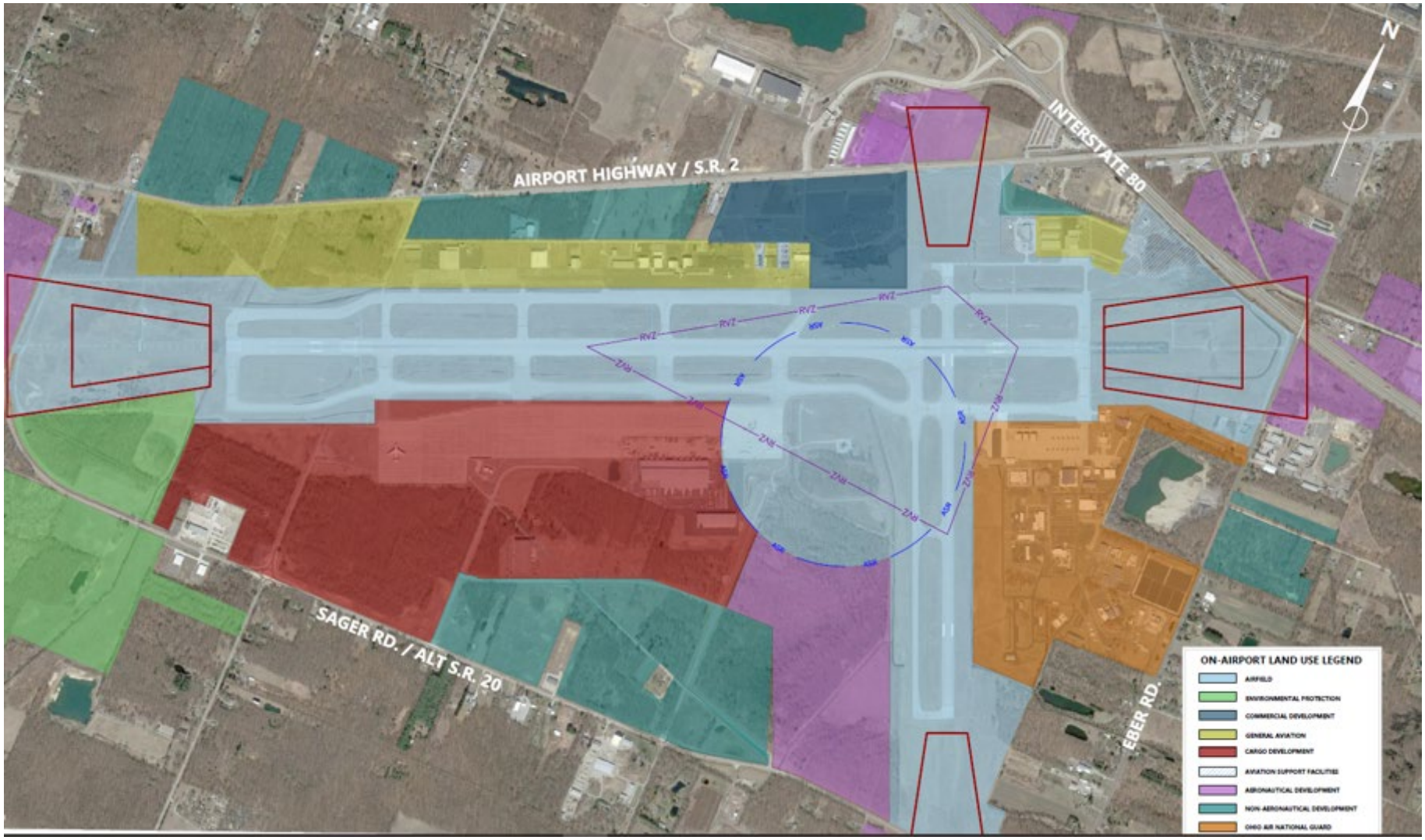
FIGURE 4-3
EXISTING AIRPORT LAND USE



Identifying land use areas where opportunities exist for land development or redevelopment helps guide airport decisions over the long-term in a way that maintains airport growth continuity, better serves the community, and minimizes costly counterproductive development. Potential areas for direct development or redevelopment have been considered to ensure future plans can still be updated relative to changing conditions.

Opportunity zones are locations where redevelopment is well-suited and likely to happen naturally due to market forces. For TOL, this includes areas along the northwest edge of the airport. There are much larger opportunity zones located to the south of the airfield. Opportunity zones to the north are well positioned along the existing flightline and GA development areas, with easy access to Airport Highway. These could potentially be a mix of aeronautical development (expanded GA facilities), and non-aeronautical development (gas stations, hotels, office parks, etc.). The much larger opportunity zones to the south have already been identified for development of industrial land uses, given abundant space and easy access to US Highway 20A. Aeronautical uses will include air cargo and MRO facilities, while non-aeronautical uses will include industrial campuses.

Development zones are the remaining airport-owned greenfield areas with different levels of access to roadways, the airfield, and infrastructure. These include areas to the north of the TOL airfield where the existing GA and ARFF facilities are located. These areas should be maintained for continued expansion of terminal/airline facilities, and aviation support facilities.

Figure 4-4 displays designated areas for opportunity zones and development zones.

Once opportunity and development zones are identified, specific land uses are determined. The overall Future Land Use Plan is depicted in **Figure 4-5**. The Future plan does not vary significantly from the Existing one, which confines passenger airline facilities to the Terminal area, while preserving space for Advanced Air Mobility facilities; General Aviation development along the northern flightline; Cargo development to the south; and non-aeronautical land uses fronting major highways. This plan also maintains space for long-term aeronautical, environmental protection, and the Ohio Air National Guard installation.

FIGURE 4-4
DEVELOPMENT ZONES

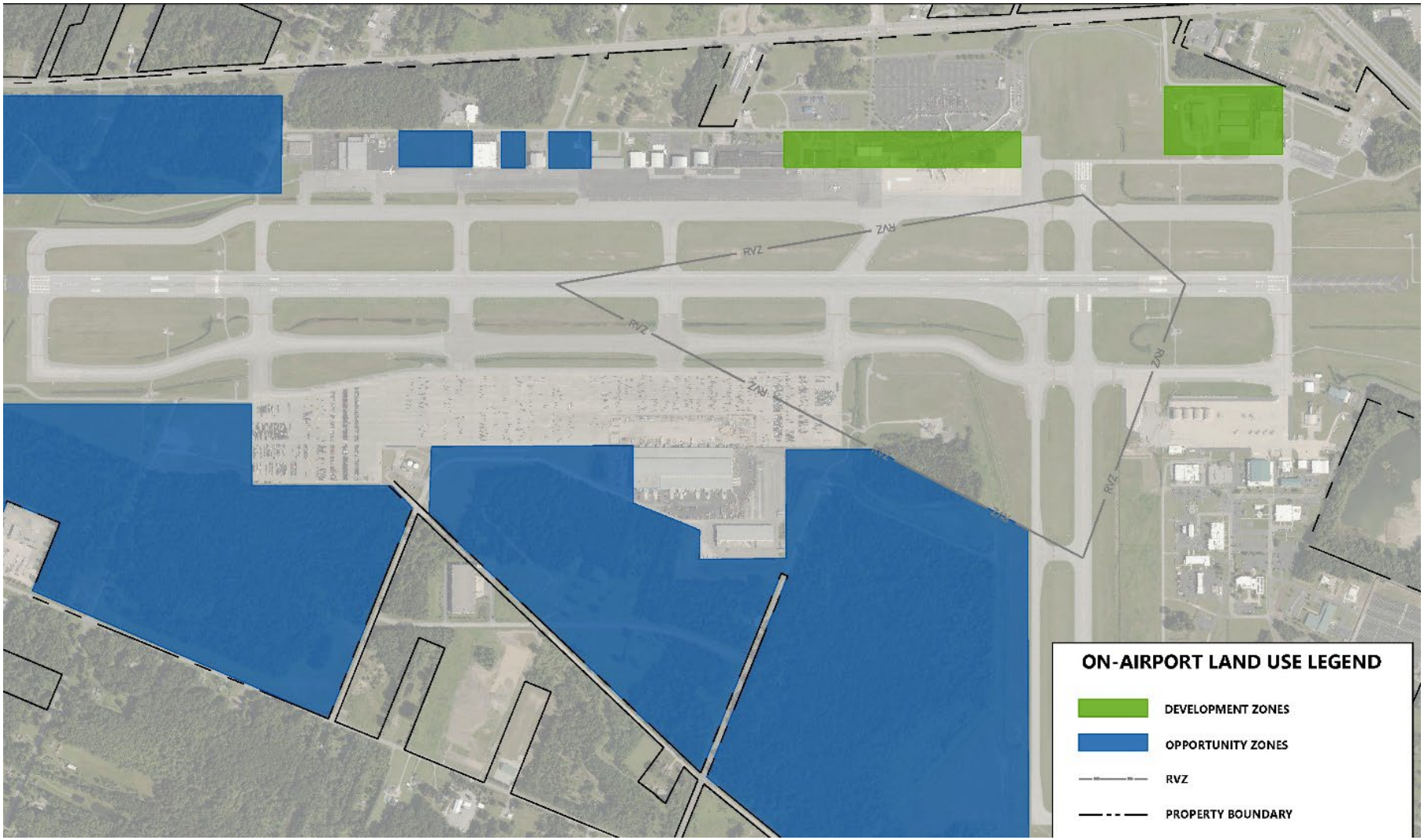
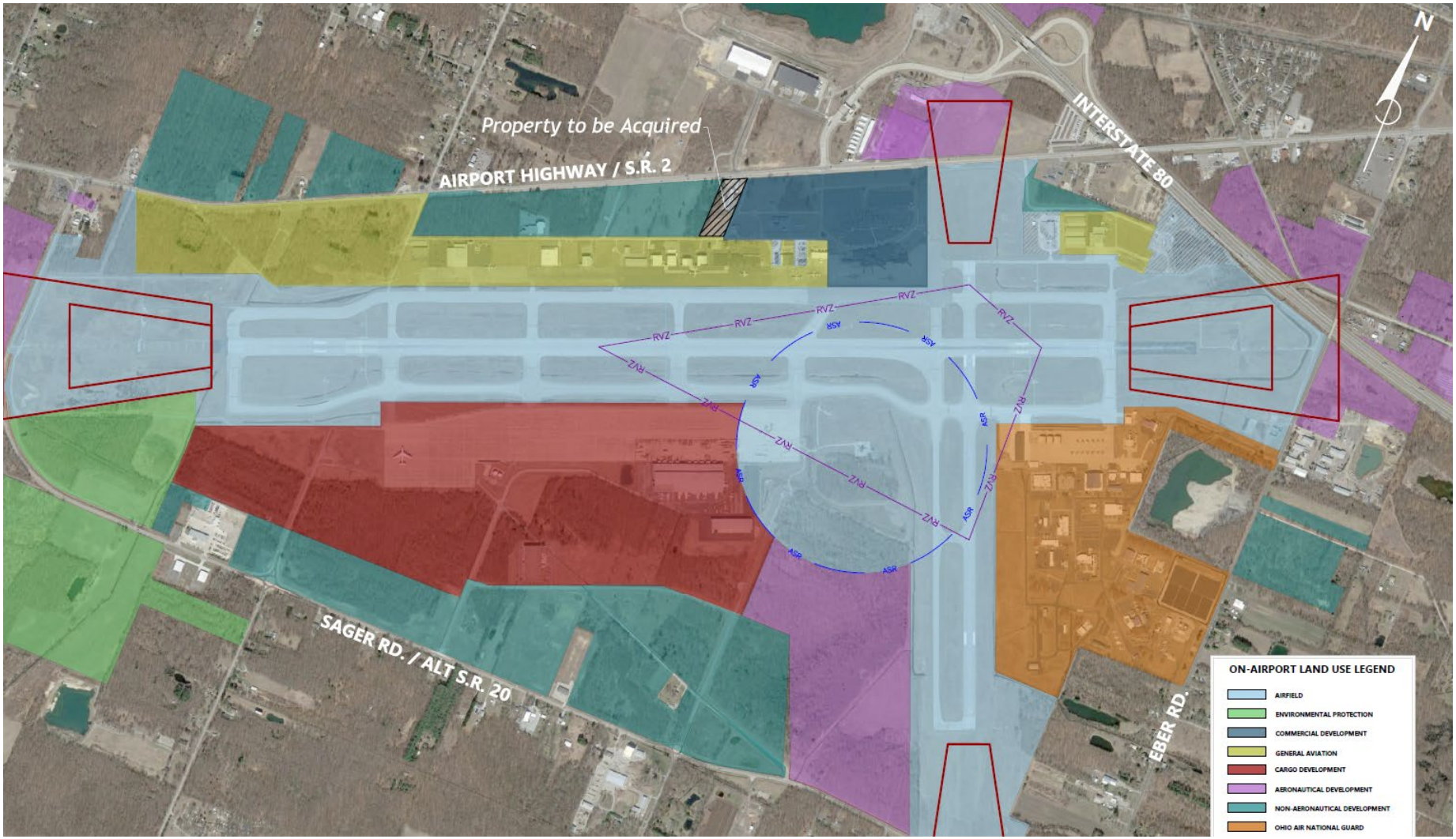


FIGURE 4-5
FUTURE LAND USE PLAN



4.3 AIRFIELD SOLUTIONS

Airfield solutions for TOL focus on four aspects of improvement:

- Meet established FAA airfield geometry and design standards
- Meet performance requirements for current and future design aircraft
- Address known or anticipated operational safety and capacity concerns
- Serve areas for future facility development

It is important to note that the current airfield configuration not only meets, but exceeds the capacity demand of all aircraft currently operating at TOL and those forecasted to operate across the planning period.

4.3.1 Runway 7-25 ILS Upgrade

Presently, TOL maintains a standard Category I (CAT I) Instrument Landing System (ILS) for primary Runway 7-25. Given its limitations, upgrading to CAT II or CAT III could greatly enhance the Airport's operational capabilities, given these approaches provide precise guidance for equipped aircraft during adverse weather conditions, thus reducing the need for direct pilot intervention and improving safe, on-time access to the airport at all times. Currently, 50-60% of all arriving aircraft at TOL are equipped for CAT II approach capabilities and 25% were capable of using a CAT III approach. A separate analysis was performed to identify the most effective way to achieve lower minimums at TOL. The recommended development plan identified achieving minimums of 100-foot Decision Height and a runway visual range of 1200-feet for both Runways 7 and 25 that was feasible at TOL through CAT II and Special Authorization (SA) CAT II upgrades, respectively. The comprehensive technical analysis, as well as a detailed plan of the process necessary to achieve a CAT II ILS approach are detailed in the *TOL ILS CAT II/III Instrument Procedure Feasibility and Equipment Upgrade* study, included as **Appendix X**.

4.3.2 Airfield Standardization

The **Facility Requirements** analysis identified several areas of the airfield not meeting current FAA design standards. These include the intersection of Runway 7-25 and Taxiway D-9, D-11, D-13, and D-6 along with the intersection of Taxiway B-6 and B-9 and Runway 7-25. These are depicted in **Figure 4-6**.

As discussed in the previous chapter, Taxiway B-6 is non-compliant with FAA design standards due to its configuration, which allows for direct access from an apron to a runway. Similarly, Taxiway B-9, in conjunction with Taxiway D-9, does not meet the prescribed standards as it poses a direct access risk to the mid-section of the runway. Taxiway D-9, along with Taxiways D-6, D-11, and D-13, also exhibit non-compliance with design standards, as they enable direct access from the apron to the runway.

The recommended plan for addressing these non-standard issues is depicted in **Figure 4-7**.

FIGURE 4-6
AIRFIELD NON-STANDARD CONDITIONS

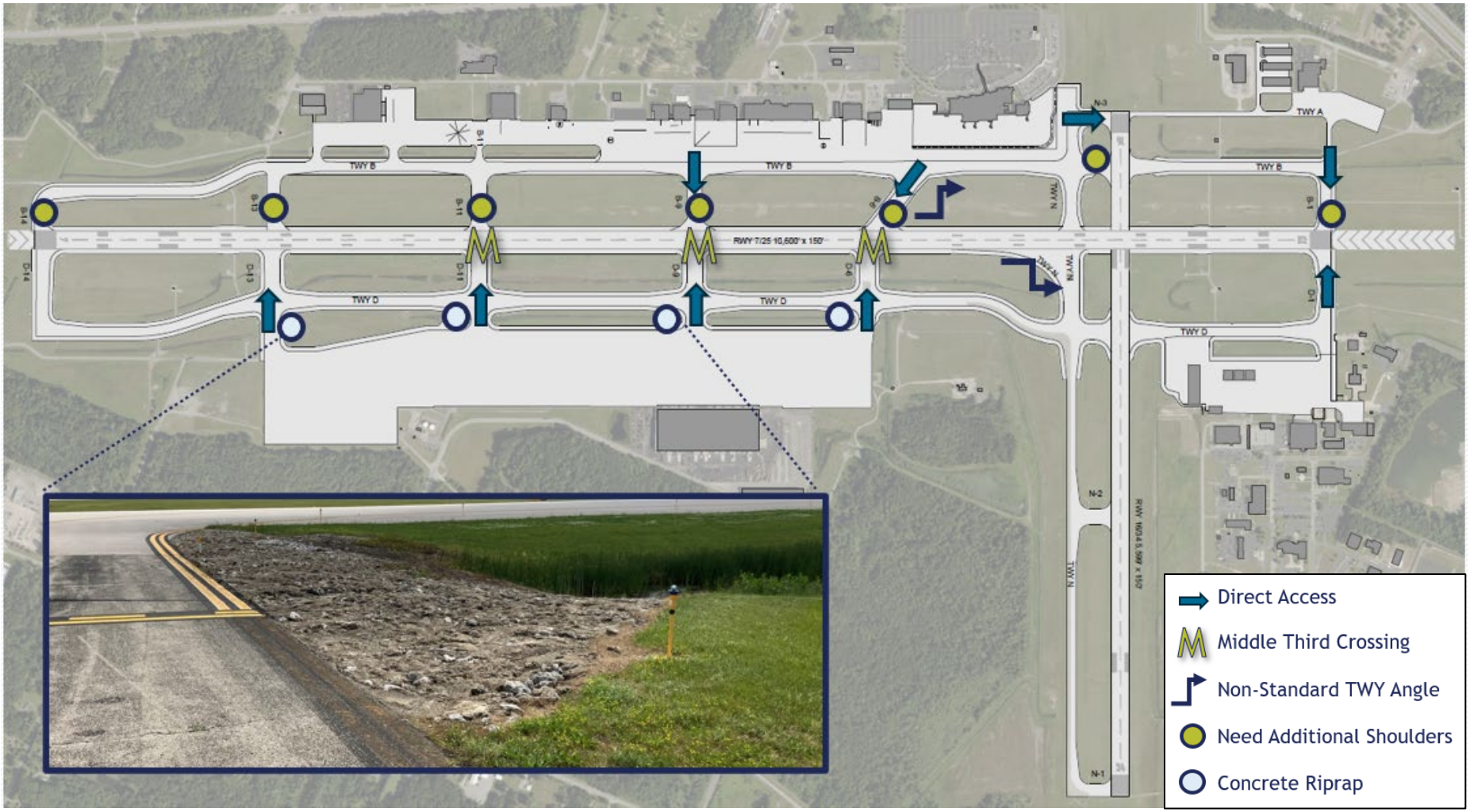
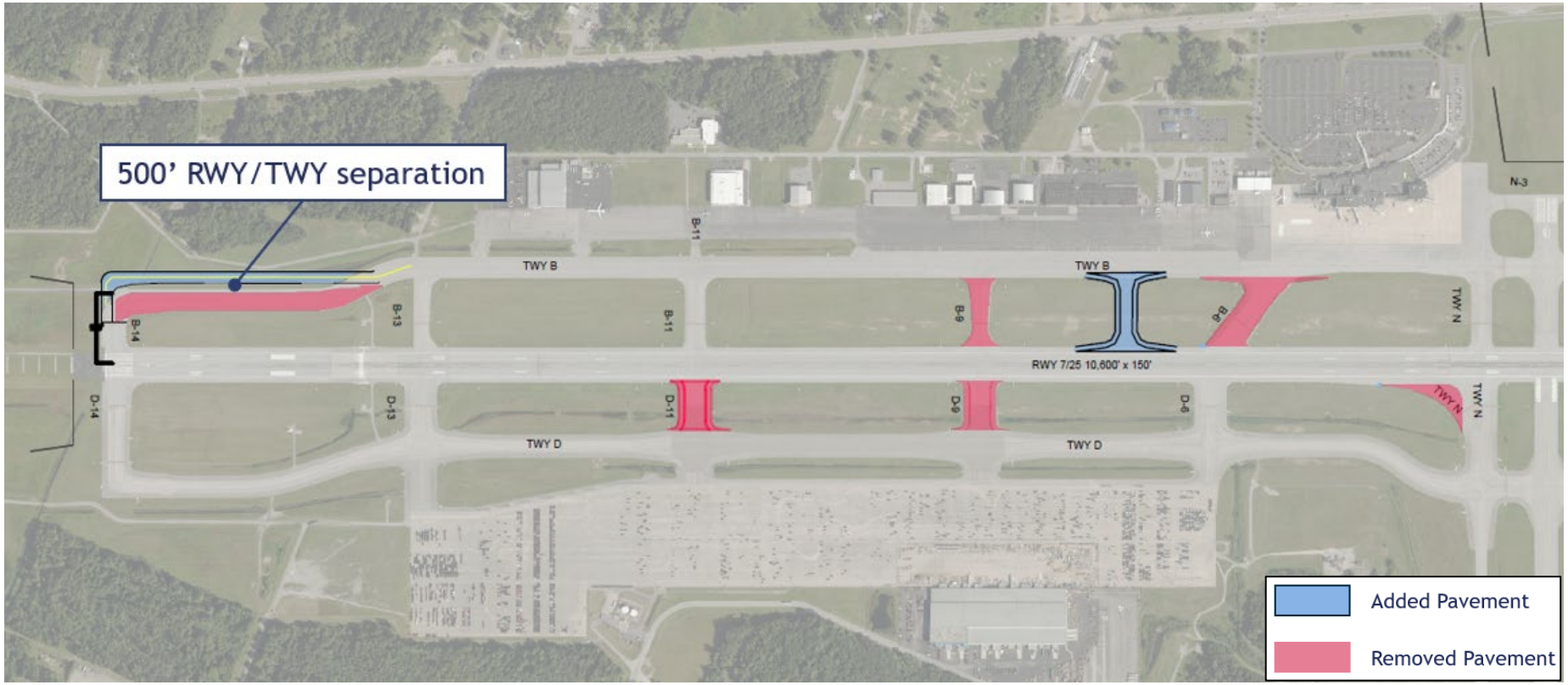


FIGURE 4-7
AIRFIELD STANDARD IMPROVEMENTS



4.3.2.1 Taxiway Connectors

The construction/relocation of a new taxiway connector in replacing current TW B-6, as well the demolition of four nearby connectors, will help in consolidating the number of high-energy intersections while maintaining necessary runway occupancy time. An analysis of airfield capacity and aircraft flow has determined the taxiway connectors to remain in this sector of the airfield will be sufficient to serve the passenger terminal while the replacement of Taxiway B-6 will further serve the needs of lgihter general aviaiton aircraft on the north side of the airfield. Furthermore, this analysis has determined that TW D-9 and D-11, which serve the south cargo apron are unnecessary for capacity, in addition to being nonstandard (both direct access and middle-third access). By removing these two connectors, capacity will remain sufficient throughout the planning period.

4.3.2.2 Taxiway Geometry

In addition to the nonstandard angle of the current Taxiway B-6, there is a nonstandard curve at the intersection of Runway 7-25 and Taxiway N. By simply reducing this pavement to standard geometry, this will alleviate the non-standard conditions without creating any concerns with capacity, safety or air traffic flow.

4.3.2.3 Taxiway B Alignment

Presently, Taxiway B has a 600-foot separation from Runway 7-25, except for the westernmost segment where it is reduced to a 400-foot separation. Initially, removing this curve and segment was explored, in order to straighten the entirety of the taxiway. Concurrent with the upgraded ILS to CAT-II for achievement of visibility minimums less than ½-mile, a 500-foot runway-to-taxiway separation is required in this segment to preserve ADG-IV airfield operations. As taxiway rehabilitation and reconstruction progresses, this segment should ultimately be relocated to a 500-foot separation prior to, or in conjunction with proposed GA development in this area.

4.4 COMMERCIAL PASSENGER TERMINAL BUILDING

This section will discuss the alternatives process for the recommended renovation of the existing commercial passenger terminal facility program as well as the alternatives analyses conducted for siting a new-build facility. Based on the passenger demand forecasts discussed earlier in this chapter, it was determined that a 59,000 square-foot facility would be necessary to meet the short-term demand and be expandable to 80,000 square-foot to meet the demand scenarios anticipated in 2041. The concepts shown in this section aim to provide layouts that can be expanded to accommodate future growth.

New-build concepts included in this report show the proposed site alternatives for a terminal facility. Prior to any design, choosing the proper site is most important, and that requires analysis of existing infrastructure, safety areas, and geographic constraints.

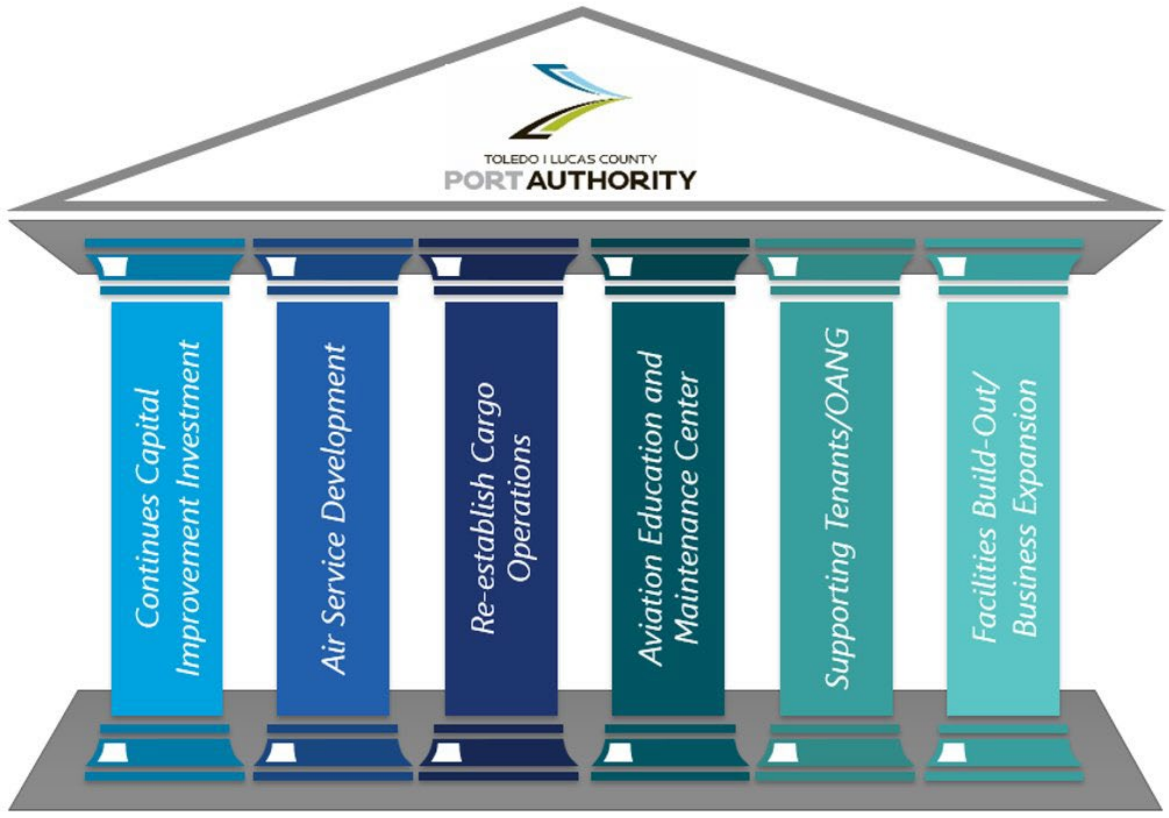
The renovation concepts show ideas utilizing the existing facility. There are several spaces of the existing terminal that are unused and past their useful life span, and by removing these elements, short term footprint reduction and rearrangement of space can be accomplished. Future facility growth can be accomplished, when needed, by having a clean building edge to expand from for program elements such as outbound baggage sorting, inbound baggage service and claim, ticketing, and holdrooms, among others.

1.1 TLCPA Vision

The TLCPA has an established vision, as outlined in **Figure 4-8,** and has developed airport-specific goals to better serve Northwest Ohio. These goals include sustainability of future infrastructure, accessibility for all airport users, and flexibility to be future ready. Sustainability of future infrastructure describes the intent to modernize the inner workings of the facility to current and projected standards, including the use of efficient electronics, natural light, and geothermal engineering. Accessibility for all airport users intends to make the airport usable for all people from getting to/from the airport, to navigating the facility from drop-off to departure, and arrival to pick-up. The flexibility to be future-ready describes the intent to leave the facility larger than the forecasted program to allow for near-term airline growth through increased service by existing carriers and/or new entrants. This flexibility to provide growth addresses future visioning provided by the Port Authority Board and airport staff discussed at the March 17, 2023, Board meeting.

This vision intends to renovate the existing facility and provide amenities within the existing terminal footprint to optimize the marketability of the existing terminal facility to attract additional carriers and flight services.

FIGURE 4-8
TLCPA ESTABLISHED VISION



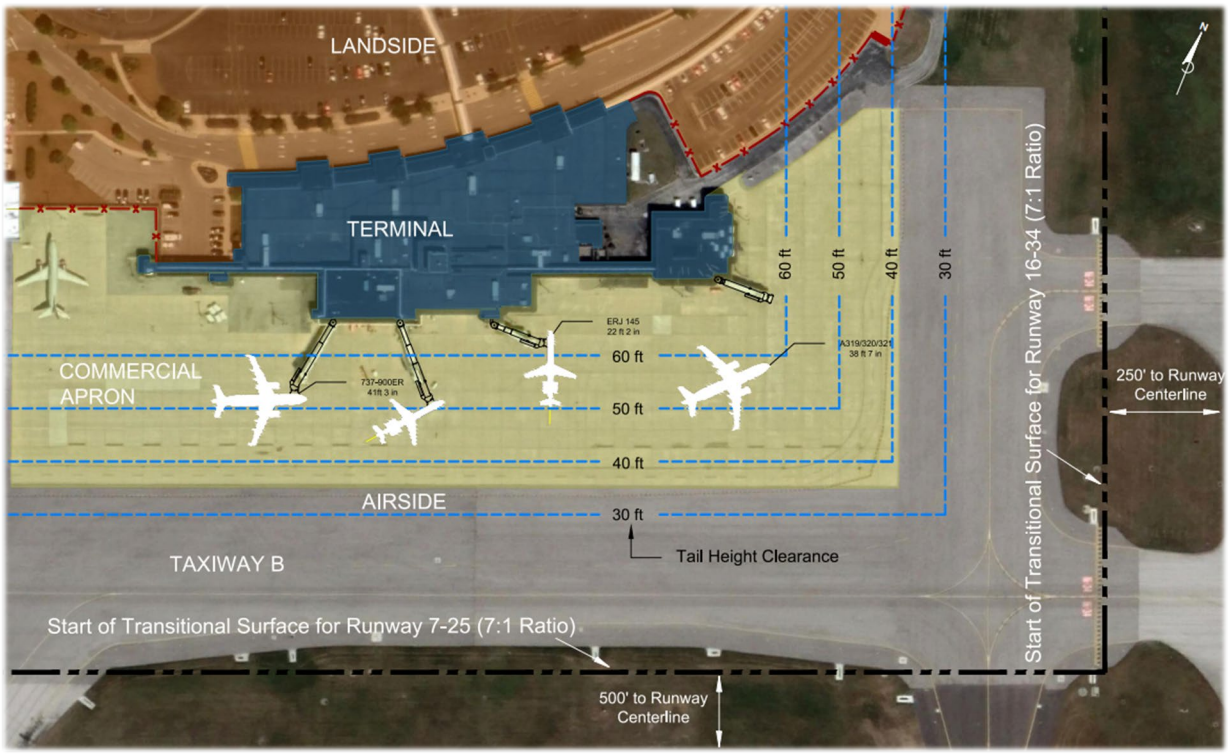
Source: TLCPA

1.1.1 Site Constraints

Though the site has an abundance of space, various constraints exist which must be considered in the development of terminal area concepts. As shown in **Figure 4-9**, the site is constrained by existing landside access to the north, existing cargo facilities to the west, a taxiway and runway to the east, and a taxiway and runway to the south. The terminal and apron must be set back from Runway 07-25 and Runway 16-34 sufficiently to ensure the Part 77 transitional surface, extending perpendicular to each runway up and out at a 7′ to 1′ slope, is not impacted. The required setback is based upon the tail height of an Airbus A320 aircraft, which is the tallest aircraft that is expected to service the passenger terminal at TOL in the future. It was determined that Terminal Instrument Procedures (TERPS) surfaces will not be impacted by any of the proposed terminal development alternatives within the site.

At the time of this writing, efforts were underway to reevaluate the condition and location of the ATCT currently within the terminal building. The FAA claims the existing tower has line of sight (LOS) issues to two runway ends and is beyond its useful life. In 2008, a siting study was completed and approved that recommended a new ATCT be constructed on an independent site west of the existing terminal along West Airport Service Road that would be owned and operated by the FAA. A subsequent design was completed in 2012 but was not publicly bid and the project was shelved. Efforts in 2023 sought to bring the project back to life to have ATCT relocation happen in parallel with any prospective terminal development program, but with no definitive direction, the existing ATCT was planned to remain untouched through the proposed terminal development alternatives.

FIGURE 4-9
EXISTING SITE CONSTRAINTS



Source: RS&H, 2023

1.1.2 New-Build Alternatives

In order to best determine a site for a newly built facility, the following points were used to assist in the decision-making process.

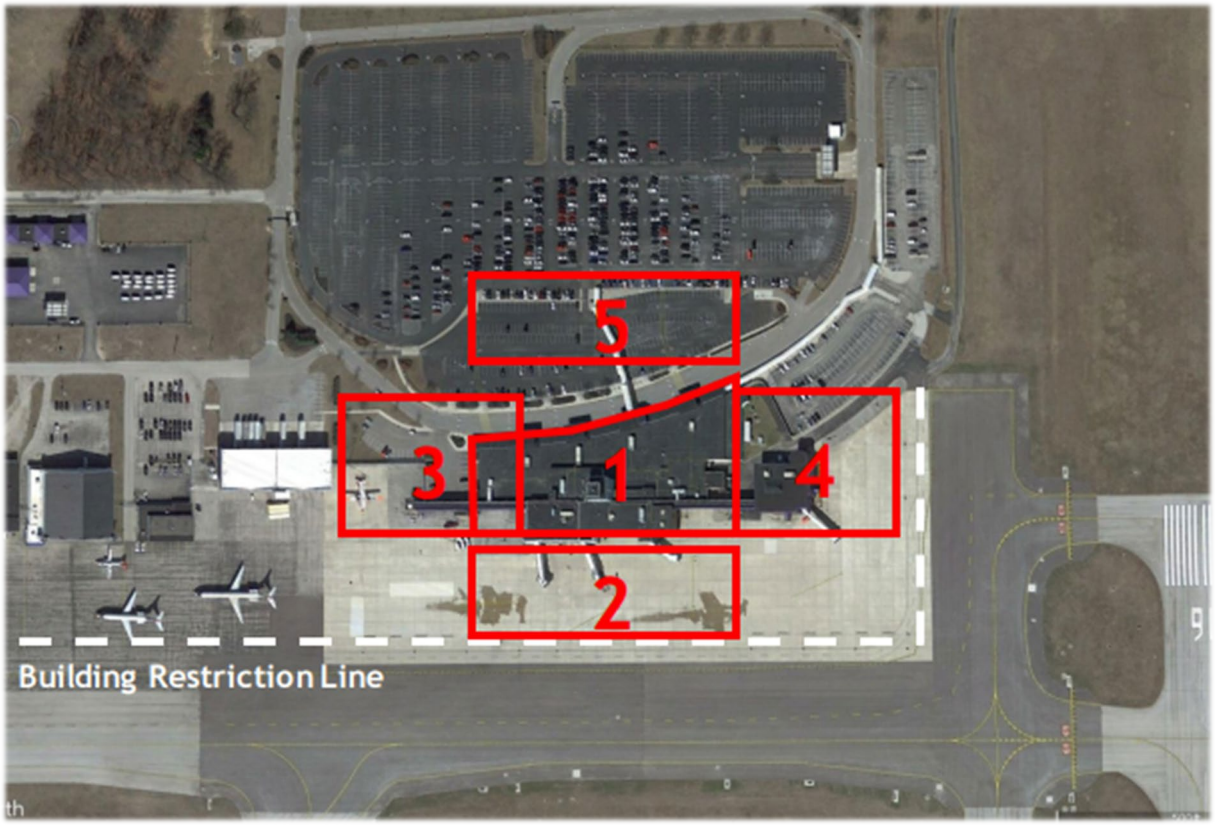
Initial key evaluation points looked at sites that would improve airfield safety. As discussed in **Section 1.5.2**, FAA Part-77 transitional surfaces determine the safety distances and heights that affect ATCT visibility lines, building restriction lines (BRL), and aircraft tail height limitations. Should a new-build facility be the preferred development option, careful consideration of these surfaces is required for terminal siting to maintain flexibility in accommodating a large variety of aircraft types. The site locations have a further effect on the design of the facility, as ATCT sight lines and compliance with the 40' BRL and aircraft tail heights will determine the extents of the structure and placement of each aircraft parking position.

A newly built passenger terminal facility would incorporate modern infrastructure, including environmental sustainability, energy efficiencies, and improved airport access. The Leadership in Energy and Environmental Design (LEED) certification process outlines numerous standards that designers and operators can adopt to utilize modern design and engineering technologies to develop and maintain and efficient facility. The terminal program layout would be arranged to provide the most effective and efficient means to move through the facility, providing ease of access from curb front to the aircraft and back again.

The placement of the terminal on each site would be determined by its ability to accommodate phased expansion. As passenger numbers grow, certain elements of the facility program become inadequately sized, so developing a layout that can easily expand at once, or in phases, is important.

Figure 4-10 shows the five new-build site locations in relation to the existing facility. As shown in the exhibit, each location makes use of the existing landside access and infrastructure. Further evaluation of each site is provided in this section.

FIGURE 4-10
NEW-BUILD SITE LOCATIONS



Source: RS&H, 2022

1.1.2.1 Site 1

This site is the location of the existing terminal, and while difficult to phase, would make use of the existing landside infrastructure almost exactly as it is currently used. Additionally, the apron infrastructure would remain as well. Careful consideration should be taken to assess whether it would be costly to reuse the existing facility should this site be preferred.

1.1.2.2 Site 2

This site builds a new facility to the south of the existing terminal. While phasing the project would be less complex as on site 1, there would be complications with the apron and location of aircraft. Numerous Part 77 surfaces, including the 40' BRL, would make aircraft parking around the proposed terminal a difficult task.

1.1.2.3 Site 3

This site builds a new facility to the west of the existing terminal, adjacent to the ticketing hall. The benefit to this site is that it can be constructed while the existing facility is in use and can utilize the existing roadways and parking facilities. Expansion would be blocked to the west, due to a cargo facility, so the only option for expansion would be eastward over the site of the existing terminal once it is demolished.

1.1.2.4 Site 4

This site builds a new facility to the east of the existing terminal, adjacent to the baggage claim facility, and on the site of the east holdroom. This site, like Site 3, can be constructed while the exiting terminal is in use, and can utilize the existing roadways and parking facilities. Expansion would only be possible to the west, as the east is blocked by the BRL, as well as other Part 77 and airfield safety surfaces.

1.1.2.5 Site 5

This site builds a new facility in the current short-term parking lot in front of the existing terminal. The size of the proposed facility would not require extensive amounts of parking area to be repurposed, and there is plenty of long-term parking area available to convert to short-term. The curbside access portion of the roadway would have to be realigned, but once completed, the new terminal would be able to expand east, south, and west. There would be more apron area for a variety of aircraft parking options, as well as an area for de-icing, and RON's.

1.1.2.6 New-Build Summary

With each of the proposed site options for a new facility, several additional tasks are needed to accommodate the new terminal site and allow the remaining FAA ATCT and TLCPA offices to remain in operation. These tasks include partial demolition of the terminal facility to accommodate the new building, enclosing remaining portions of the existing building, rerouting building systems to accommodate the partial demolition, reworking airfield pavement areas, and rerouting site utilities.

Conceptual budgets for a new terminal facility are difficult to determine without a preferred layout, scope, and full estimate. Ranges for constructing the new minimally-recommendation 59,000 square foot terminal facility (per the base aviation forecast) are approximated (in 2023 dollars) as follows: $65M to $80M for a new terminal facility (including partial existing terminal demolition); $10M to $20M for utility rerouting, roadway realignment and parking lot modifications; $5M to $20M for airfield improvements, and $40M to $50M for demolition of remaining portions of the terminal facility. Eligibility percentages will be impacted by this approach, which may increase the local share of funding a new terminal facility versus renovating the existing facility.

1.1.3 Renovation Alternatives

With the footprint of the existing terminal facility already surpassing the programmable space required per the aviation activity forecast, as well as being located in the most desirable location for safe and secure transition between landside and airside operations, the TLCPA prefers to renovate the existing facility bringing the building up to current building and FAA design requirements. The preferred terminal renovation concept, selected by the TLCPA, is based on the previously discussed (**Section 1.5.4**) new-circulation option 5. This preferred concept, known as the refined development plan, was further refined as an implementable program with rough order-of-magnitude (ROM) cost estimates generated to establish a threshold by which future value engineering efforts could be made better suiting the proposed terminal facility to the vision, implementation, funding capacity, and future considerations of the TLCPA.

The aim of the refined redevelopment plan was to provide a conceptual program that could be visualized by the TLCPA serving as a design development "baseline." Input from the TLCPA during this programming stage prompted the creation of two alternatives further refining this option that are anticipated to serve as a blueprint leading into design phase of the proposed project. These two alternatives are further discussed later in this section.

1.1.4 Alternative 1 – New Build Integration

The TLCPA has continued to promote the airport and greater Toledo metropolitan area as not only the gateway to northwest Ohio, but also a key neighbor to large metropolitan service areas that have more congested airspace (i.e., Detroit and Cleveland). As discussions and growing relationships continue to develop with low-cost and ultra low-cost carriers, the TLCPA believes growth in the near-term is very possible with a new airline/market as well as potential for the return of a regional legacy service largely attributed to the COVID-19 pandemic. The availability of a terminal already able to accommodate growth would present a huge advantage and selling point for the airport.

Alternative 1 creates a hybrid approach with a new terminal, constructed to support the needs of the aviation forecast, constructed within the footprint of the existing terminal, and integrated with a portion of the current facility to remain.

1.1.4.1 Facility Layout

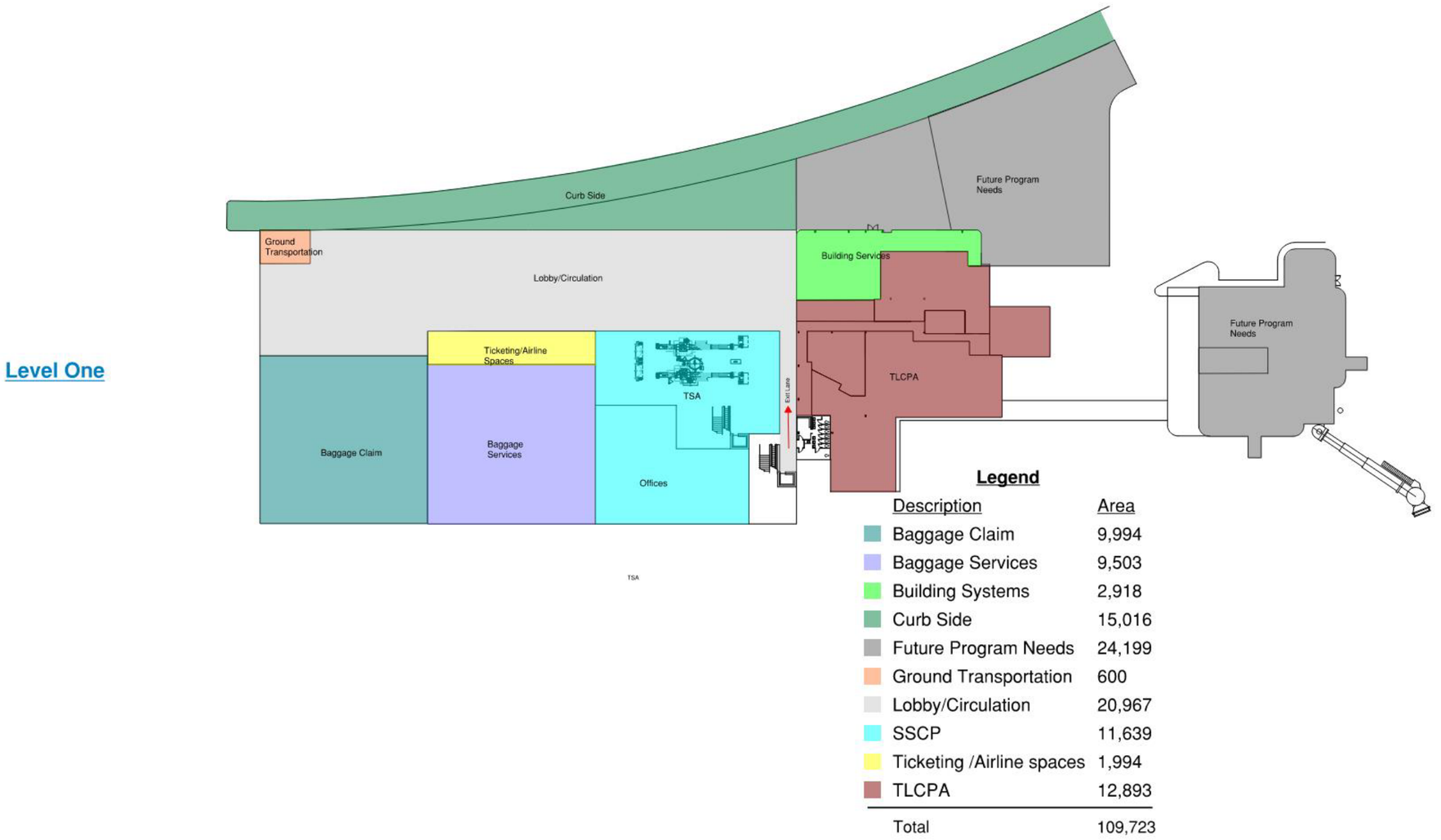
With the existing terminal serving as a longitudinal barrier between landside and airside facilities, the approach of Alternative 1 would essentially construct a new facility on the existing western terminal footprint that would include all passenger service facilities with the existing eastern footprint to remain inclusive of mechanical/building support system space, airport and stakeholder administrative spaces, and storage/room for eastern expansion. The FAA's ATCT, currently in the middle of the existing terminal, serves as a conceptual "dividing" of proposed new construction versus renovation spaces. **Figure 4-11** and **Figure 4-12** depict the proposed layout for Alternative 1.

As eligibility of project costs participating in federally-funded projects is often dependent on space that is both accessible to the public and non-revenue generating or may be common use to airlines, Alternative 1 would permit the TLCPA to maximize funding support of the new terminal and related passenger services, while establishing a separate scope of renovation for those spaces not related to the public and thus not as likely to receive funding support.

1.1.4.2 Health and Safety

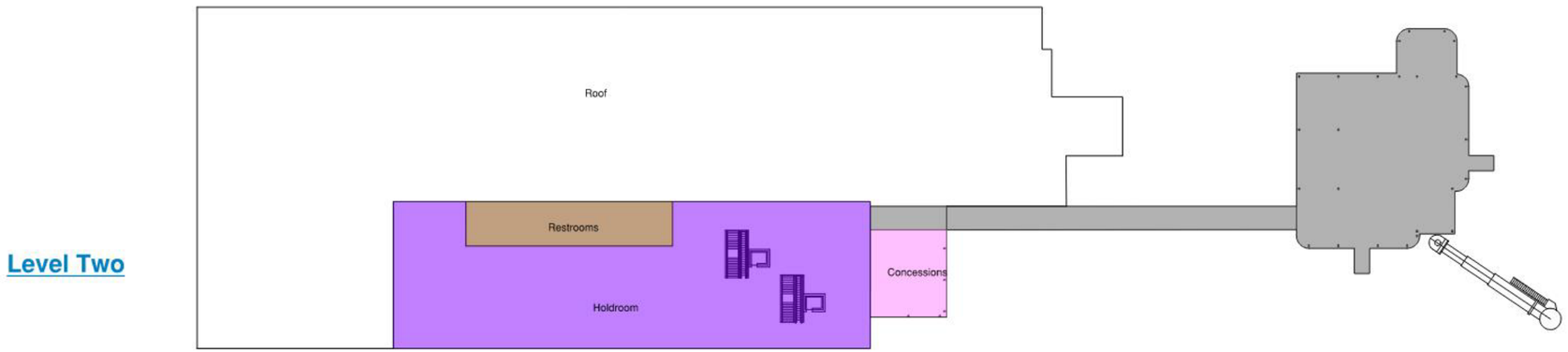
Similar to the refined redevelopment option, Alternative 1 would be able to address elements within the existing facility that is to remain that need modernization, including removal of materials to provide a cleaner air environment, replacing outdated equipment to install more efficient technology, and ensuring accessibility compliance as well as an enhanced level of service to passenger in the proposed new terminal construction.

FIGURE 4-11
ALTERNATIVE 1 – LEVEL ONE



Source: RS&H, 2023

FIGURE 4-12
ALTERNATIVE 1 – LEVEL TWO



Legend

Description	Area
Concessions	1,722
Future Program Needs	10,907
Holdroom	15,763
Restrooms	2,375
Total	30,767

Source: RS&H, 2023

1.1.4.3 Preliminary Cost Estimate

Rough order magnitude (ROM) cost estimates were generated for Alternative 1. The estimates were broken into the same categories as the refined redevelopment option, but the landside site work, upgrades in mechanical, electrical and other infrastructure were based on an allowance that could increase/decrease as the time of design based on funding available. All costs include associated program engineering and construction fees. Impacts to existing airside facilities are assumed to be minimal per the program scope and thus are not included in these cost estimates. **Table 4-1** details the ROM cost estimate for Alternative 1. All estimate values were increased by a constant 10 percent escalation rate consistent with industry pricing trends for calendar year 2028, the proposed last year of project construction at the time of this writing.

TABLE 4-1
ROM PROJECT COSTS – ALTERNATIVE 1

	DEVELOPMENT AREA	QUANTITY	UNITS	UNIT PRICE (2028 ADJUSTED)	TOTAL (2028 ADJUSTED)
New Terminal Addition					
1	Partial Demolition of Terminal	1	LS	$8,000,000	**$ 8,000,000**
2	New Addition	58,900	SF	$1,089	**$ 64,143,000**
Existing Terminal Renovation					
3	Building Envelope Replacement	1	LS	$3,960,000	**$ 3,960,000**
4	Plumbing Upgrades, Fire Sprinkler Modifications, Restroom Renovation/Expansion	2,000	SF	$50	**$ 99,000**
5	Mechanical System Renovation	2,000	SF	$122	**$ 243,000**
6	Electrical System Renovation	2,000	SF	$90	**$ 180,000**
7	Technology System Renovation	2,000	SF	$72	**$ 144,000**
8	Interior Renovation of Existing Finishes	2,000	SF	$180	**$ 360,000**
Sitework					
9	Sitework Improvements	1	LS	$324,000	**$ 324,000**
10	Add for Glass Jet Bridges	2	EA	$2,002,500	**$ 4,005,000**
	Total Construction ROM Estimate - 2028 Adjusted:				**$ 81,378,000**
11	Engineering Design + Contingency				**$ 8,376,000**
	Total Program ROM Estimate - 2028 Adjusted:				**$ 90,420,000**

Source: McGuiness Unlimited, Inc./RS&H, 2023

1.1.5 Alternative 2 – Temporary Footprint Reduction (*Preferred*)

Alternative 2 focuses on the same objective as Alternative 1, to preserve as much of the existing building footprint as is viable to increase the attractiveness of the airport to airlines concerned with growth capacity but does so through a reconfiguration and consolidation of the "active" space needed to support current-day operations. By consolidating terminal facilities, costs of infrastructure modernization, renovation, and future costs of operation will be greatly decreased while not sacrificing the remaining structure in the event of needed expansion. Alternative 2 was selected by the TLCPA as the preferred terminal development alternative.

1.1.5.1 Facility Layout

The consolidation of the terminal facility is focused on reducing the active footprint of public spaces to that of the needs as outlined in the terminal facility requirements to minimize development costs, maximize funding support and eligibility, and to maintain a high level of efficiency and security.

The consolidation of Alternative 2, depicted in **Figure 4-13** and **Figure 4-14**, includes a reorientation of the west airline ticket counters and walling off of unused space as well as a similar relocation of the baggage claim from the furthest eastern extent to be closer to the main traffic flow of the terminal. Vertical circulation improvements will be made to ease security checkpoint congestion with enhanced wayfinding helping to promote continual passenger flow. TLCPA and other stakeholder administration spaces will largely remain in their current location as will the building support systems staying consistent with the proposed consolidation plan as well as future expansion opportunities. Spaces that are walled off from public access can be used by airport or other operations staff until a future expansion opportunity arises.

1.1.5.2 Health and Safety

Alternative 2 would feature the same removal, replacement, and modernization of all hazardous materials and antiquated equipment as the refined redevelopment option, but at a prorated percentage of the existing space to meet the needs of the reconfigured space.

1.1.5.3 Preliminary Cost Estimate

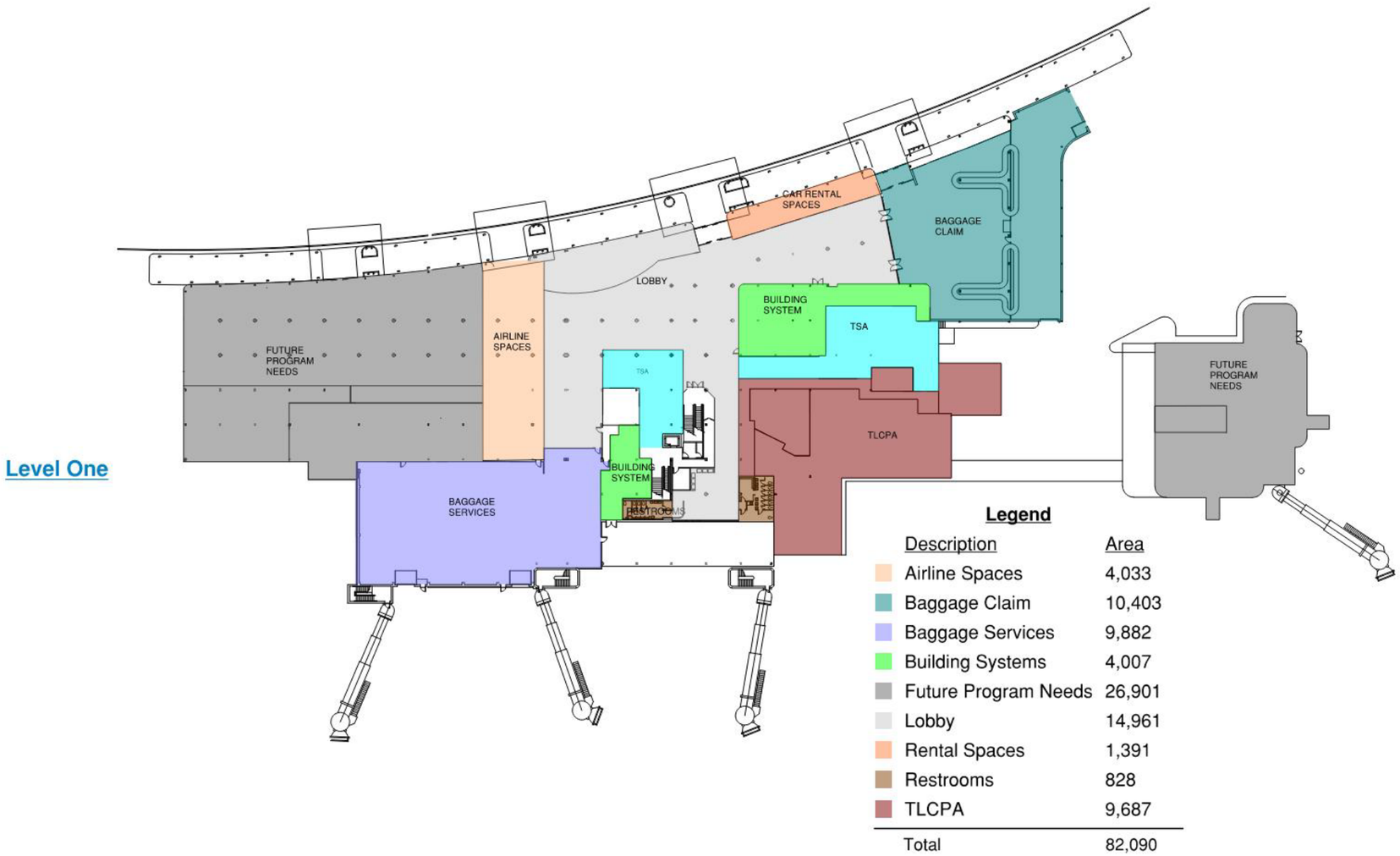
Rough order magnitude (ROM) cost estimates were generated for Alternative 2 (see **Table 4-2)**. As this alternative is comprised of the renovation and consolidation of the existing facility, the only cost associated with new construction is reserved for enhancements to be made to the vertical circulation corridor. Impacts to existing airside facilities are assumed to be minimal per the program scope and thus are not included in these cost estimates. All other costs and renovation scope are believed to be consistent with that of the refined redevelopment alternative. All estimate values were increased by a constant 10 percent escalation rate consistent with industry pricing trends for calendar year 2028, the proposed last year of project construction at the time of this writing.

TABLE 4-2
ROM PROJECT COSTS - ALTERNATIVE 2

	DEVELOPMENT AREA	QUANTITY	UNITS	UNIT PRICE (2028 ADJUSTED)	TOTAL (2028 ADJUSTED)
New Terminal Addition					
1	Partial Demolition of Terminal	1	LS	$1,926,000	**$ 1,926,000**
2	New Addition	5,000	SF	$1,771	**$ 8,856,000**
Existing Terminal Renovation					
3	Building Envelope Replacement	1	LS	$7,920,000	**$ 7,920,000**
4	Plumbing Upgrades, Fire Sprinkler Modifications, Restroom Renovation/Expansion	64,000	SF	$48	**$ 3,042,000**
5	Mechanical System Renovation	64,000	SF	$118	**$ 7,542,000**
6	Electrical System Renovation	64,000	SF	$88	**$ 5,643,000**
7	Technology System Renovation	64,000	SF	$69	**$ 4,437,000**
8	Interior Renovation of Existing Finishes	64,000	SF	$177	**$ 11,349,000**
Sitework					
9	Sitework Improvements	1	LS	$324,000	**$ 324,000**
10	Add for Glass Jet Bridges	2	EA	$2,002,500	**$ 4,005,000**
	Total Construction ROM Estimate - 2028 Adjusted:				**$ 55,044,000**
11	Engineering Design + Contingency				**$ 6,116,000**
	Total Program ROM Estimate - 2028 Adjusted:				**$ 61,160,000**

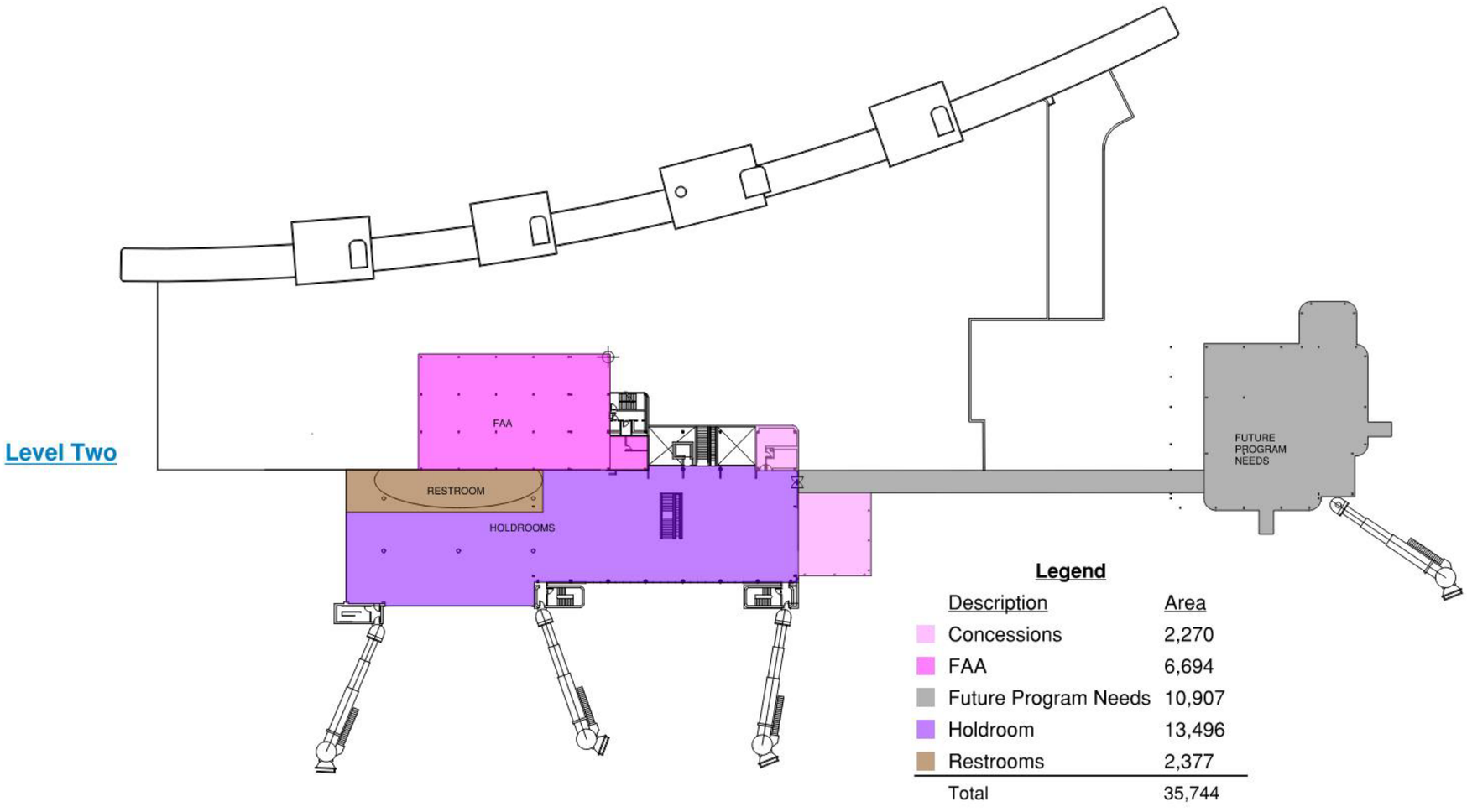
Source: McGuiness Unlimited, Inc./RS&H, 2023

FIGURE 4-13
ALTERNATIVE 2 – LEVEL ONE



Source: RS&H, 2023

FIGURE 4-14
ALTERNATIVE 2 – LEVEL TWO



Source: RS&H, 2023

4.5 GENERAL AVIATION

Data-driven analysis of the existing general aviation (GA) facilities at TOL reveal most are nearing capacity and end of useful life in the short-term planning period. As such, to accommodate increasing demand during the Master Plan 20-year horizon, many facilities are anticipated to require expansion, reconfiguration, and/or updates over the short- and long-term period.

The GA and support alternatives for TOL focus on four main aspects of improvement:

- Relocation to provide space for ultimate terminal expansion
- Align with the Airport's long-term vision for staffing, management, and administration
- Enact strategic design improvements for safety and operational efficiency
- Accommodate future facility expansion

General aviation and support facilities are important but dependent upon airfield and terminal area configurations. For this reason, GA development solutions have been evaluated on the east and west sides of the Airport.

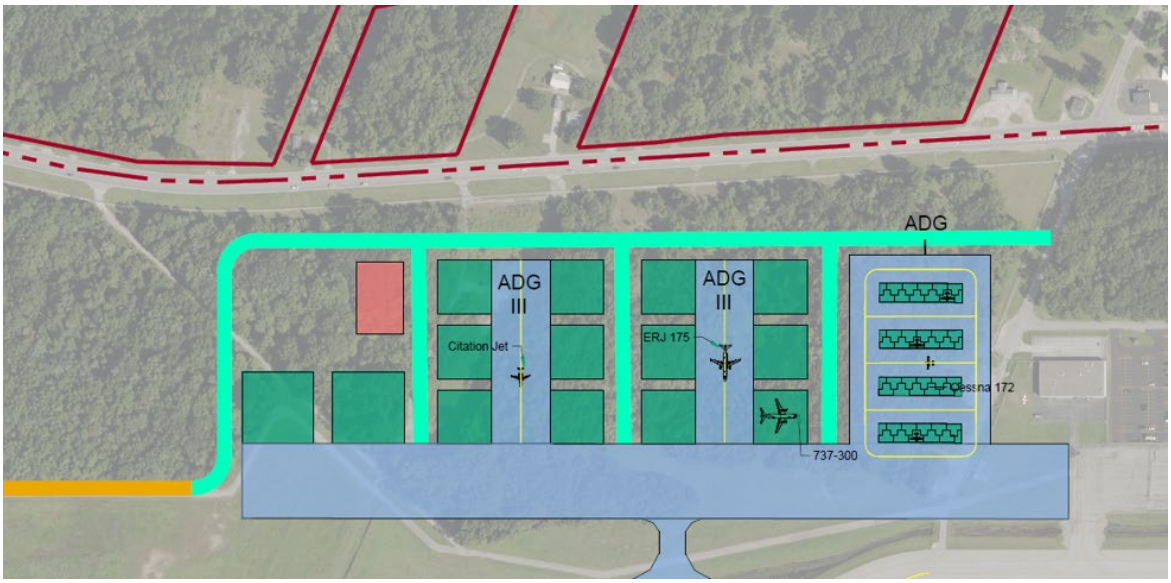
4.5.1 Hangar and GA Development

The **Facility Requirements** chapter highlighted anticipated growth of based turboprop and turbojet aircraft as well as an influx of transient aircraft over the planning period, creating the need for additional GA hangars. Proposed solutions include areas on the west and east side of the airport for future GA development.

4.5.1.1 GA Development Solution – West Side

The west-side GA development envisions four distinct quadrants featuring a mix of corporate, conventional, and nested T-hangar units. This proposed development, illustrated in **Figure 4-15**, will further extend the airport's existing apron to the west, and offers a flexible phased implementation approach. Additionally, the orientation and proposed use of any quadrant "block" can be adjusted according to the airport's preferred development goals at the time of implementation.

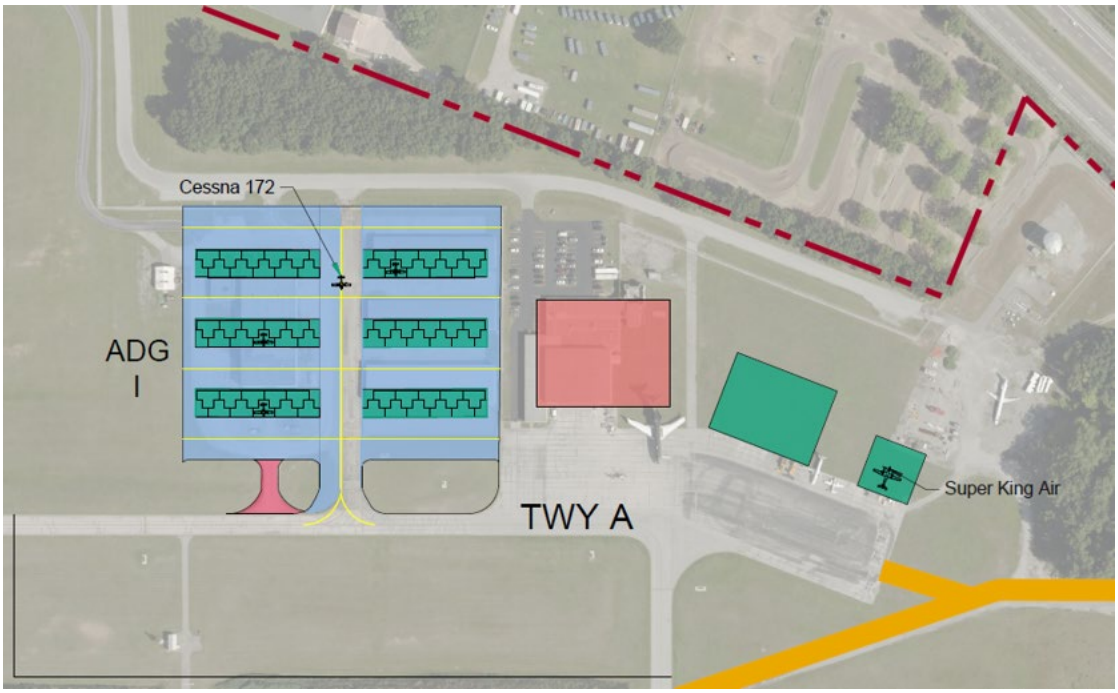
FIGURE 4-15
GA DEVELOPMENT SOLUTION – WEST SIDE



4.5.1.2 GA Development Solution – East Side

The east-side GA development is comprised of two sections featuring nested T-hangars situated within the existing airfield maintenance facility area. This development optimizes existing pavement for the T-hangars while introducing a new building for aeronautical purposes, as well as corporate and conventional hangars. This versatile solution also offers the possibility of phased development. **Figure 4-16** illustrates east side GA development that could also host a future additional fixed base operator (FBO).

FIGURE 4-16
GA DEVELOPMENT SOLUTION – EAST SIDE



4.6 CARGO DEVELOPMENT

Given the anticipated growth in cargo operations detailed in the TOL **Forecast of Aviation Activity**, as well as the impact of new operators on existing facilities, strategic planning for future cargo expansion is imperative. Two primary alternatives for the south cargo apron are further explored below.

4.6.1 South Cargo Apron Development Alternatives

Currently, Amazon Air operates at TOL and occupies one of two cargo handling facilities located adjacent to the south airfield cargo apron with the other facility occupied by a GSE manufacturer. Since the arrival of Amazon Air in 2021 and further supplemented by GA operations, the airport has experienced accelerated cargo activity growth requiring a reallocation of facilities and resources for both airside and landside support. Both alternative concepts feature varied layouts that incorporate additional cargo, hangar, and MRO space to the west and south of the existing cargo apron. These concepts are displayed in **Figure 4-17**, and **Figure 4-18** below. While Concept 2 allows for additional hangar space, preferred Concept 1 permits more apron parking space for aircraft, which is more practical for cargo operations and in better alignment with the TLCPA's vision.

FIGURE 4-17
SOUTH APRON DEVELOPMENT SOLUTION – CONCEPT 1 (PREFERRED)

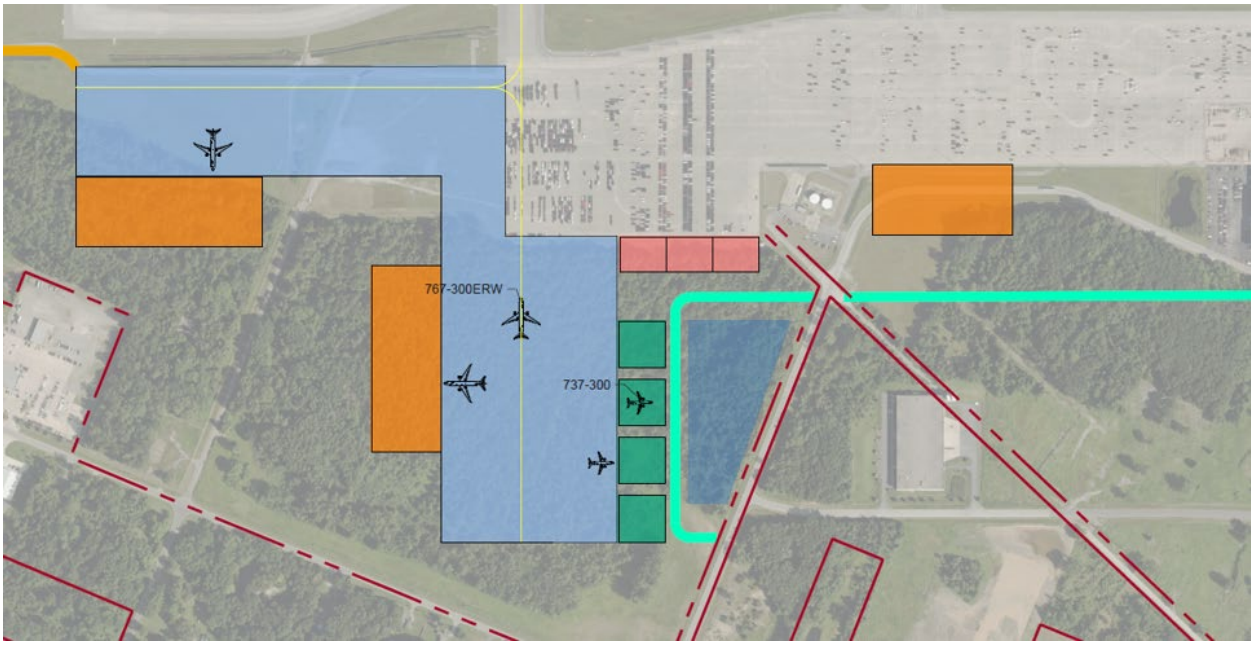


FIGURE 4-18
SOUTH APRON DEVELOPMENT SOLUTION – CONCEPT 2

4.7 SUPPORT FACILITIES

Airport support facility requirements demonstrated the current space allocated for ARFF facility, airfield maintenance/snow removal equipment (SRE) facility, and administrative spaces are currently adequate but not optimal. The primary issue with these facilities is that the location and configurations are not ideal to support the Airport's staffing and management preferences or promote growth opportunities. Alternatives recommend including a support facility campus with maintenance, ARFF, and police in one centralized location.

4.7.1 ARFF/Maintenance/Public Safety Campus

Three different operations at TOL and their respective facilities are near the end of their useful life and as part of the development alternatives, alternative sites for development/relocation were identified. These operations, Public Safety, Airfield Maintenance and SRE, and Aircraft Rescue and Firefighting (ARFF), and their purposes are further described below.

Airfield operations, as well as security at TOL are overseen by the Public Safety team, situated in a facility west of the main terminal, ensuring both landside and airside access. Despite the current facility meeting basic requirements and federal guidelines, the facility is both constrained for future development and is nearing the end of its useful life, having been originally constructed in the 1960s. To address these issues, the preferred solution of relocating the aging facility within the planning period are identified and evaluated in this section.

The existing airfield maintenance facility is approximately 22,500 SF and houses all the airport's airfield maintenance and snow removal equipment (SRE) as well as space for vehicle maintenance. Many of the facilities' build support systems have surpassed useful life and the building itself and is near maximum capacity for equipment storage. As such, to accommodate the acquisition and proper storage of new equipment and operations, it is proposed the existing airfield maintenance facility by relocated during the planning period to a more suitable location with the existing site to be repurposed for airport development purposes.

The current location of the ARFF facility at TOL currently meets Index B requirements and response times. However, future ARFF development with either a satellite location or relocated, centralized facility has been developed as part of this master plan. A centralized facility, collocated with airport maintenance and administrative facilities could provide a strategic advantage that aligns on-demand, airport-staffed team providing ARFF services.

As detailed in the **Facility Requirements** chapter, the anticipated facility needs in a centralized campus for the planning period are as follows:

- Public Safety
    a. Administrative building and vehicle storage for the airport operations and safety team.
    b. Roughly 12,000 SF of programmable space for planning alternatives.
- Airfield Maintenance
    a. Storage and maintenance space for airfield service and SRE
        i. SRE: 17 existing pieces of equipment, with plans to acquire two more.
        ii. SRE storage facility area deficit as shown in **Table 4-3**.
    b. Some equipment is stored in the old ARFF facility, but still does not provide the space needed, and as a result some equipment is stored outdoors.
    c. Roughly 26,350 SF of programmable space for planning alternatives.
- Aircraft Firefighting and Rescue (ARFF)
    a. Anticipated facility roughly 20,000 SF with 5 vehicle bays and personnel facilities.

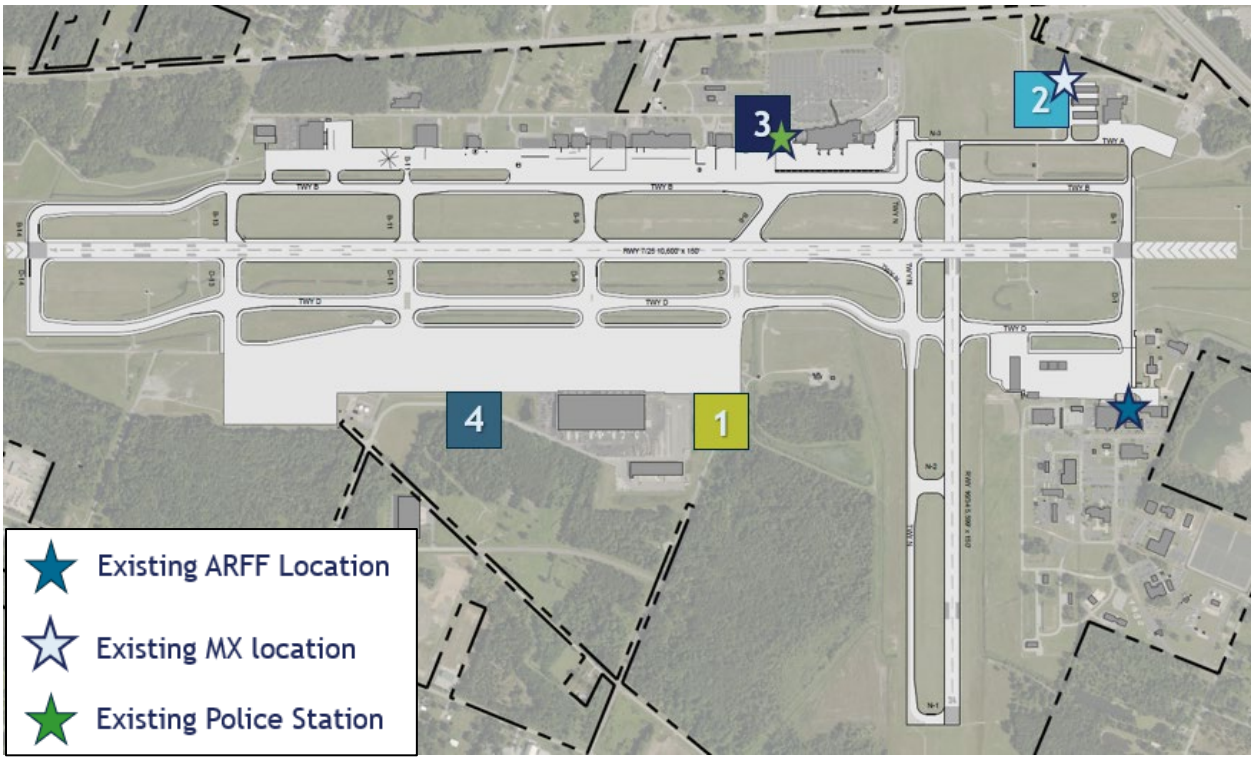
TABLE 4-3
MAINTENANCE/SNOW REMOVAL EQUIPMENT STORAGE AT TOL

	Existing	PAL 1	PAL 2	PAL 3
Total Area	22,500	24,900	25,600	26,350
Surplus (Deficit) (sf)		(2,400)	(3,100)	(3,850)

Source: RS&H, 2023

The recommended plan to address facility issues is to combine maintenance and SRE, ARFF, and police facilities into one campus will implement ease and efficiency of support operations at the Airport. The alternative locations for this campus are displayed in **Figure 4-19**. Each location will be evaluated to determine a preferred location.

FIGURE 4-19
ARFF/MX/POLICE CAMPUS ALTERNATIVES



Alternative 1 (Central Airfield) - Preferred

Alternative 1 is located at the eastern edge of the South Cargo Apron. While this area is intended for significant future growth of aeronautical and non-aeronautical uses, it is presently located far from the majority of aviation activity on the north side of the airfield. Development in this location would enable the use of the existing infrastructure and landside/airside access, but as the location is within the clearance radius of the Airport Surveillance Radar (ASR), additional analysis on the impact to navigational communications systems would be required to clear. This location may also have environmental and wetland impacts that would require further examination.

Alternative 2 (Northeast)

Alternative 2 is located at the northeastern section of Airport property, where the airfield maintenance facilities are currently located. This site offers substantial room for future expansion, allows separation of vehicle and aircraft traffic, and utilizes existing infrastructure. This site is, however, alternatively intended for future GA development and better suited to the purposes of revenue-produced aviation activity.

Alternative 3 (Terminal Area)

Alternative 3 is located where the current Public Safety facility is, adjacent to the terminal. Despite this centralized location having convenient airside/landside access, it would require tenant relocation, reconfiguration of that Air Operations Area (AOA) boundary, and will still feature constrained development space with little room for expansion. Similar to Alternative 2, this location is would also be ideal for revenue generating aeronautical development.

Alternative 4 (South of Cargo Apron)

Alternative 4 is located on the southern edge of the cargo apron, just west of the cargo sorting facility currently occupied by Tronair, Inc. This site has similar advantages as Alternative 1, having ample room for future expansion, but also requires extensive stormwater infrastructure reconfiguration.

An evaluation of each alternative is depicted in **Figure 4-20**.

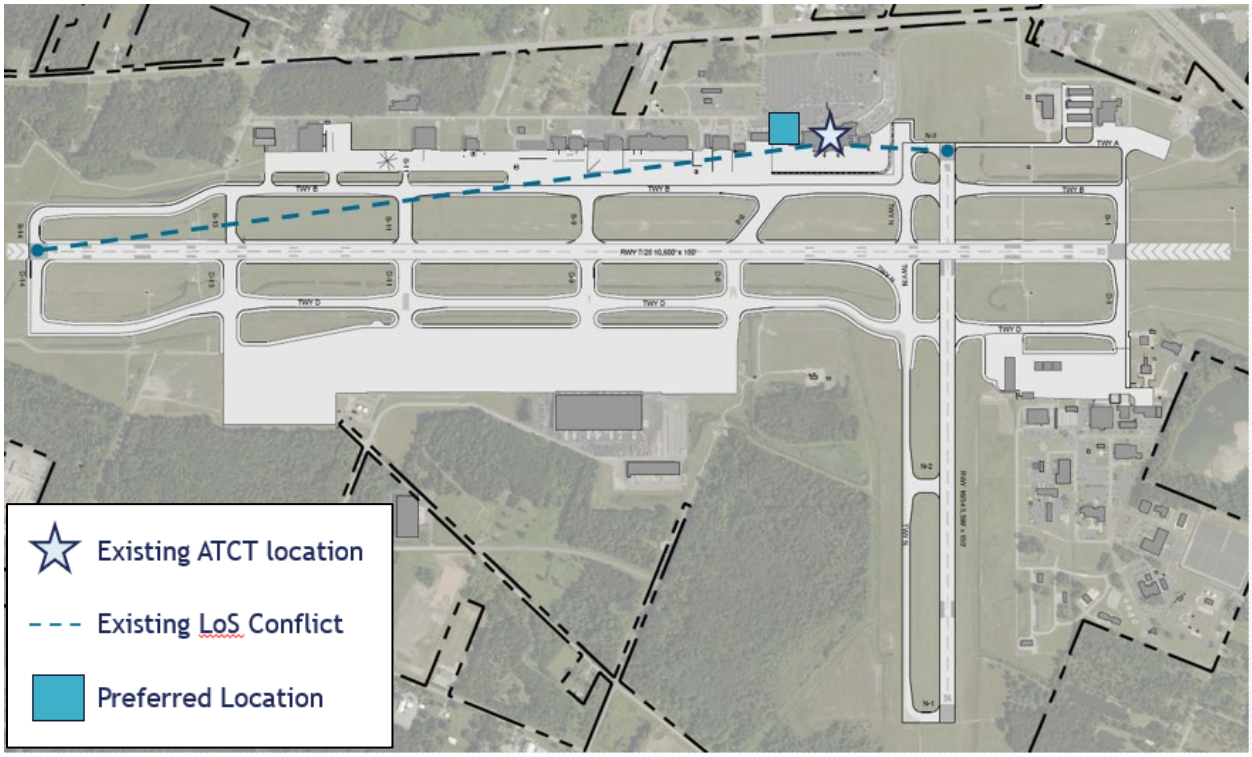
FIGURE 4-20
EVALUATION OF ALTERNATIVES

	ARFF/MX/Police Alt -1	ARFF/MX/Police Alt -2	ARFF/MX/Police Alt -3	ARFF/MX/Police Alt -4
Operational Efficiency				
Resolution of Current Issues				
Environmental Impacts				
Flexibility for Future Expansion				
Ease of Implementation				
ARFF Response Times Met*				

4.7.2 Air Traffic Control Tower

As discussed in the previous chapter, the existing Air Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) are located within the terminal facility. The facility was constructed in 1952, resulting in outdated facilities and infrastructure, as well as access and security issues for staff. Additionally, there are ATCT line-of-sight (LoS) issues, specifically with Runway 16 and Runway 25 thresholds. The need for a replacement ATCT at TOL has been identified in previous studies, with several potentially viable locations identified for a future tower. While potential locations were identified around the airfield in accordance with FAA Order 6480.4B, Airport Traffic Control Tower Siting Process, a study completed in 2008 identified a preferred site on vacant land immediately adjacent to the western side of the commercial terminal and employee parking Lot. As such, this master plan study will carry forward that preferred site, depicted in **Figure 4-21**.

FIGURE 4-21
PREFERRED ATCT SITE



4.7.3 Utilities

While the Facility Requirements analysis identified no critical utility deficiencies at the airport, there is anticipated demand for improvements to existing infrastructure. Discussions with Toledo Edison, the local electric utility company, indicated the ability to accommodate the future growth of TOL. However, while the capacity is currently viewed as sufficient, there have been power outage issues at the airport in recent history that will require further investigation prior to any large scale development. The TLCPA is also committed to ensuring sufficient service through the investment in other sources of sustainable power in the near future. In addition to ensuring power capacity through the planning period and beyond, as well as eliminating future brownouts/power capacity issues, the Airport is focused on:

- Long term growth and development of passenger electric vehicle (EV) charging.
- Support for AAM/UAV aircraft/charging.
- Capacity and/or extensions for improved commercial terminal facilities.
- Introduction of redundancy into the utility system through the implementation of sustainable energy generated from clean, renewable sources such as solar energy systems.
- An airport-wide microgrid system to establish Airport energy independence, thereby promoting financial self-sufficiency and protecting the airport's central role in community resiliency during disaster recovery.

4.7.3.1 Microgrid

A major emerging trend in sustainability and energy independence is the implementation of microgrid systems, particularly at airports. In addition to providing financial self-sustainability and resiliency to aid the community during disaster recovery, microgrid systems are key steps in preventing future capacity issues and brownouts. A microgrid is an on-site energy system with its own independent storage and (often, multiple) source(s) of generation. These systems can operate independently, off the local power grid, co-locating energy supply and demand onsite, providing most day-to-day energy needs. A microgrid system exclusively feeds its own operator, in this case, the Airport. Additionally, unlike common back-up generators that only function in the event of an outage, these operate constantly. Their everyday use delivers power whenever needed as a supplement to what is provided by the local power grid. A full microgrid system allows energy independence, reliability and resilience, and a clear path towards zero-carbon electricity use.

In the case of TOL, a full planning study would need to be developed for implementation of a microgrid system. Such a study would:

- Evaluate the Airport's exact energy needs now and in the long-term
- Determine additional stakeholders (i.e., other Airport tenants) to utilize the system
- Based on size and use, locate the optimal site for a system
- Analyze method(s) of power generation to be used
- Estimate a cost and implementation strategy

Presently, microgrids at airports are an emerging trend employed only at a select few larger commercial-service airports. Given TOL's commitment to remaining ahead of the curve in emerging trends at airports and in sustainability, evaluating a microgrid system is a solid goal for the Airport moving forward.

4.7.3.2 Electric Aircraft Charging Station

The advent of electric aircraft presents a potential near-term need to integrate new charging facilities into airport facilities. This creates a need to understand the degree of impact as it relates to:

- Ownership models
- Impacts to airport financial policies
- Early adopters and forecast demand
- Size and location of charging infrastructure
- Demand on existing utility infrastructure (transmission lines, transformers, substations, etc.)
- Aircraft fleet, battery types, charge rates, and design (charge station versus battery swap)
- Impacts to the economy and the environment
- Impacts to airfield infrastructure

Preliminary review of TOL electrical utility infrastructure shows it to be sufficient to handle, at minimum, any potential small-scale near-term increase in electrical demand as result of aircraft charging stations. The investment can be made by the Airport or its tenants. Under the preferred airport alternative, it is prudent to understand best practices when implementing aircraft charging stations. Some of the lessons learned from electric automobiles also translate into the aviation industry. The following sections will discuss best practices and implementation strategies to consider.

These best practices will focus less on specific details of implementation such as types of charging stations, and more on overarching policies to ensure a variety of charging stations can be successfully implemented.

Implementation and Best Practices

- Determine the target user at the airport and focus on customer level of service. This will help determine placement and proximity to desirable amenities for the targeted user. For example, if the charging station were placed immediately adjacent to the FBO terminals, the targeted user would most likely be transient aircraft. If the station were placed near corporate hangar development, the targeted user would most likely be for based aircraft. Understanding what drives user behavior will help ensure investment in charging stations is maximized.

- Make charging stations highly visible to promote them and protect them. Signing and marking electric charging stations helps promote their use while also protecting them from damage. Consider physical barriers such as bollards around the stations to ensure aircraft cannot accidentally hit them. Placing stations at the edges of apron (non-airfield side) and buildings is much safer than in open spans of pavement.

- Seek out and join partnership networks to stay involved and current with electric aircraft trends. Electric aircraft and battery technology are burgeoning and remaining current with new information allows the Airport to promote the technology among those who may be early adopters such as airport tenants. Coordinating with ODOT, local economic development groups, and tenant stakeholder groups can provide avenues to technology information as well as supplemental funding opportunities.
- Review and update airport policies as electric aircraft charging gains favor to ensure the Airport remains self-sufficient and meets federal grant assurances. This will require information about charging by unit of energy (probably kilowatt-hours) to accurately account for the impacts on Airport revenues. It would benefit the Airport greatly to require tenants to collect and provide that information, just as fuel sales information would be provided, so as the Airport may monitor and track overall use. At some point, the Airport may need to review and amend minimum standards, lease guidelines, development review guidelines, and/or Airport rates and charges fee structure.

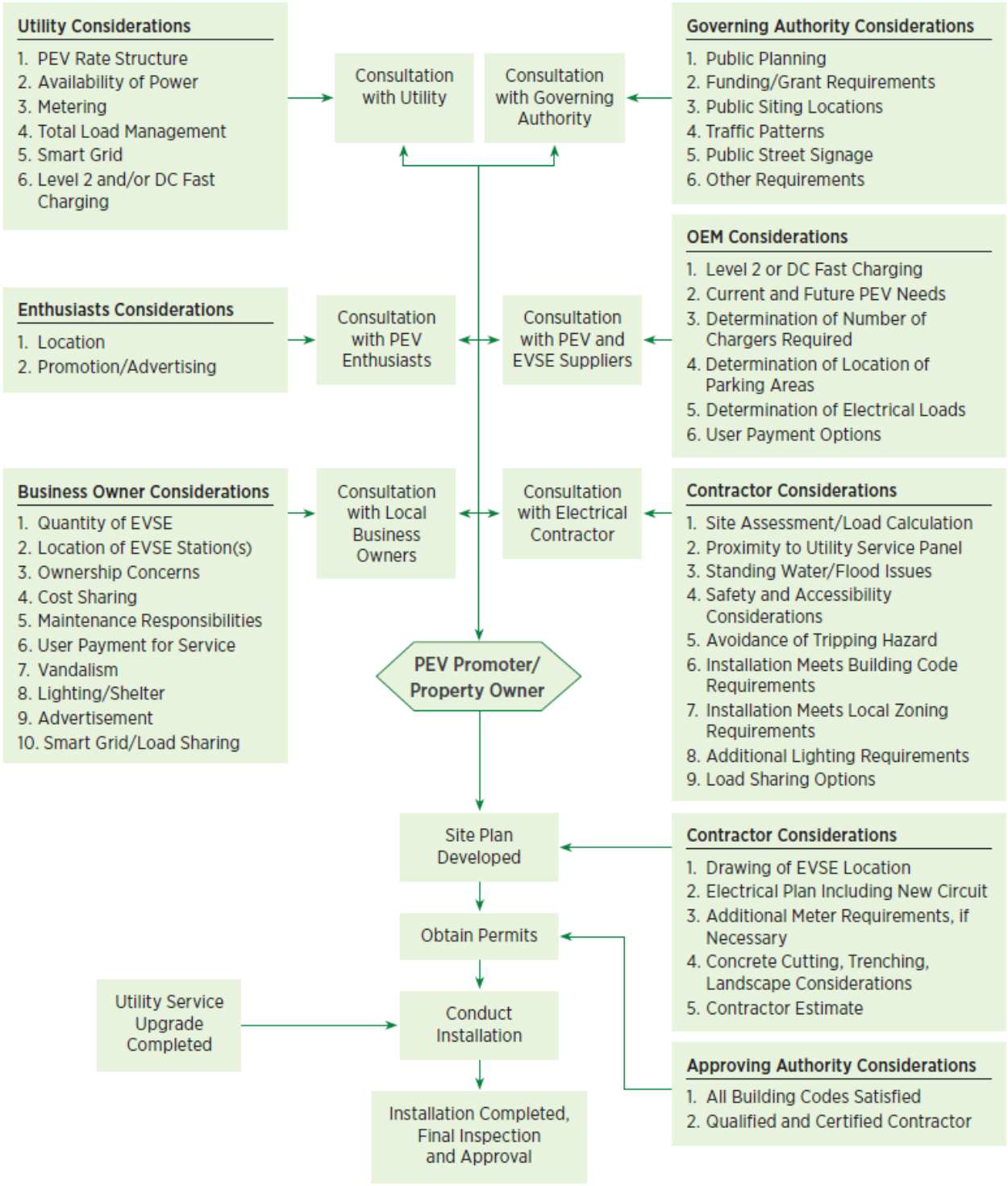
- Educate tenants and airport users about resources and opportunities. The EPA, peer airports, and industry leading charging station providers like ChargePoint are all excellent sources of information. The Airport can research and consider techniques for how to incentivize use, get ideas for implementing cost-savings measures (such as off-peak charging), and promoting airport sustainability practices. Having electric charging stations creates potential for FBOs to begin integrating new ground electric handling equipment into the fleet as older equipment is removed from service.

The U.S. Department of Energy has published the Plug-In Electric Vehicle Handbook for Public Charging Station Hosts. This report, while designed for electric vehicle charging and not aircraft, provides some of the same factors that should be considered in planning for electric aircraft charging stations. **Figure 4-22** shows the general process for installing an electric vehicle charging station at a public facility.

The U.S. Department of Energy also provides implementation considerations including the following:

- Electric charging stations require specialty equipment and extensive electrical work; therefore, well qualified contractors should be selected to do the work. The condition and location of equipment will dictate the complexity of the installation.
- Charging station installations must comply with local, state, and national codes and regulations, and be installed by a licensed contractor.
- Site and equipment considerations should include:
  - User convenience
  - Hazard avoidance
  - Proper ventilation of equipment
  - Battery temperature limits
  - Pooled water and irrigation protection
  - Impact prevention
  - Vandalism prevention (lighting, motion detectors, tamper alarms, etc.)
  - Distinctive signage
  - Accessibility meeting ADA requirements
  - Lighting and shelter needs
  - Payment models/methods and data collection
  - Aesthetics
  - Maintenance and trouble reporting

FIGURE 4-22
GENERAL PROCESS FOR INSTALLATION OF ELECTRIC VEHICLE CHARGING STATIONS



Source: eTec, *Electric Vehicle Charging Infrastructure Deployment Guidelines for the Oregon I-5 Metro Areas of Portland, Salem, Corvallis, and Eugene*, 2010

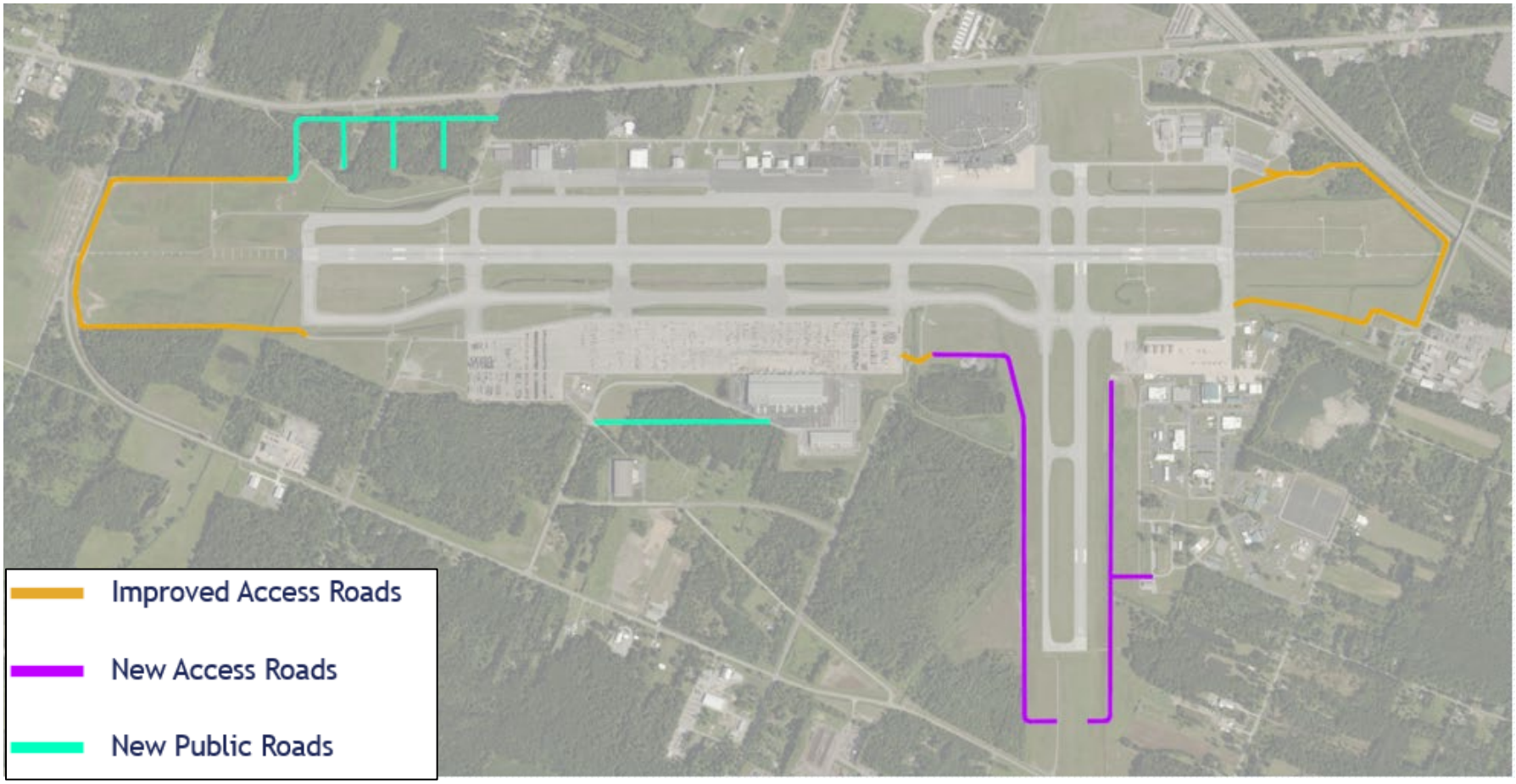
4.8 AIRPORT ACCESS AND CIRCULATION

Although the current levels of service at the Airport, such as traffic congestion, remain satisfactory, certain projects aim to optimize on-airport vehicular circulation and access during the planning period. The primary goal is improving the airfield perimeter road, allowing for restricted access for airport service vehicles. The current perimeter road consists of several incomplete sections. It is recommended during the planning period that these sections are developed in conjunction with the implementation of the preferred alternative. As discussed in the **Facility Requirements**, portions of the perimeter road to the east and west of Runway 7-25 are unpaved and/or in poor condition, requiring certain large vehicles (such as ARFF trucks) to utilize airfield runways and taxiways.

In addition to rebuilding these existing perimeter routes (Improved Access Roads) within the air operations area (AOA), to achieve a proper, full airfield perimeter road, additional access (New Access Roads) should be built to the south, circling the lower half of Runway 16-34, providing access from the existing cargo apron to the OANG facilities. These roads would also be fully within the AOA. Lastly, part of the full perimeter access will be achieved utilizing public access roads (outside of the AOA), along the north side of the airfield from the General Aviation areas to the Terminal Areas. These new thoroughfares are identified as New Public Roads.

The perimeter road development plan can be seen in **Figure 4-23** below.

FIGURE 4-23
PERIMETER ROAD DEVELOPMENT PLAN



4.9 ENVIRONMENTAL OVERVIEW

4.10 RECOMMENDED DEVELOPMENT PLAN

The recommended development plan is the combination of all preferred facility development concepts over the planning period and beyond. Through collaborative workshops with Airport leadership and the public involvement process, a comprehensive preferred development future was selected. That comprehensive preferred development future is shown in **Figure 4-24**. Chapter 5, *Financial Feasibility and Implementation Plan* will address the funding and implementation of Airport development projects. Note that while a new Air Traffic Control Tower (ATCT) has been analyzed, its implementation, funding, and timeframe are separate from this Master Plan Process. The projects in the recommended development plan are organized into the following timeframe:

Near-Term (0-5 years)

- Terminal Improvement Program – Phase 1
- Development of New Aircraft Rescue and Firefighting (ARFF) Facility
- Implementation of Approach Upgrades to Runway 7-25
- Shift of Taxiway B for 500' Separation
- Improvements to West Perimeter Road
- Development of South Perimeter Road

Medium-Term (6-10 years)

- Terminal Improvement Program – Phase 2
- Development of New Airfield Maintenance Facility
- Improvements to East Perimeter Road
- Northwest General Aviation Development
  - T-Hangars
  - Box Hangars – Phase 1
- Standardized Taxiway Connector Implementation and Removal of TW B6 and B9
- Nonstandard Curve Removal

Long-Term (11-20 years)

- Development of New Airport Police Facility
- Northwest General Aviation Development
  - Box Hangars – Phase 2
  - FBO and Additional Box Hangar Development
- Northeast General Aviation Development
- Removal of TW D9 and D11
- Development of MRO Facilities

Ultimate (20+ years)

- Development of Cargo and Industrial Campus

FIGURE 4-24
RECOMMENDED DEVELOPMENT PLAN

NEAR TERM

1. Terminal Improvements - Phase 1
2. New ARFF Facility
3. Implement Approach Upgrades to RW 7-25
4. Shift TW B to 500' Separation
5. West Perimeter Road
6. South Perimeter Road

MID TERM

7. Terminal Improvements - Phase 2
8. New Airfield Maintenance Facility
9. East Perimeter Road
10. T-Hangar Development
11. Box Hangar Development
12. Standardized Taxiway Connector
13. TW B6, B9 Removal
14. Nonstandard Curve Removal

LONG TERM

15. New Airport Police Facility
16. Box Hangar Development / Addtl. TW Connector
17. Box Hangar / Support Facility Development
18. T-Hangar / FBO Development
19. TW D9, D11 Removal
20. MRO Development

OTHER*

- UIL Development of Cargo / Industrial Campus
- A New Air Traffic Control Tower
- B Additional Hangar Development

**Additional facilities either not included as part of the Master Plan Study, or to be developed beyond 20-Year Planning Period*